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ORIGINAL ARTICLE

TIME TO RECOVERY FROM COVID-19 AMONG PATIENTS IN SIDOARJO REGENCY, EAST JAVA PROVINCE, INDONESIA IN 2022

Waktu Untuk Sembuh Dari COVID-19 di Antara Pasien di Kabupaten Sidoarjo, Provinsi Jawa Timur, Indonesia Pada Tahun 2022

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ABSTRACT

Background: The SARS-CoV-2 mutation in the bodies of COVID-19 patients is a critical factor for health. Notably, in October 2022, the disease recovery rate in Sidoarjo (96.05%) was lower than the national rate (97.30%). **Purpose:** This study aims to identify the recovery time and its influencing factors in COVID-19 patients in Sidoarjo. **Methods:** The life-table method was used to conduct a survival analysis on data from the NAR COVID-19 dashboard in Sidoarjo from January 3 to August 4, 2022, which involved 20,662 respondents. Age group, sex, treatment status, and testing purpose were analyzed. **Results:** The majority of COVID-19 patients were females (50.30%) aged *26-<46 years* (46.24%). Most patients (64.74%) chose to self-isolate, and 63.34% were screened as COVID-19 positive. On average, patients recovered within seven days of diagnosis. The Wilcoxon (Gehan) statistical test yielded a p-value of less than 0.001 for all factors at a significance level of 0.05, indicating a significant difference in the survival time distribution. The age group with the shortest median recovery time was *6-<12 years* at 7.03 days, while males had a median recovery time of at 7.66 days. Patients who self-isolated had a median recovery time of 7.16 days, and those who were tested for close contact purposes had a median recovery time of 7.65 days. **Conclusion:** The median recovery time for COVID-19 patients post-diagnosis was seven days. There was a significant difference in recovery time among the COVID-19 patients based on age group, sex, treatment status, and testing purpose.

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ABSTRAK

Latar Belakang: *Mutasi SARS-CoV-2 di dalam tubuh pasien COVID-19 merupakan faktor penting bagi kesehatan. Khususnya, pada bulan Oktober 2022, tingkat kesembuhan penyakit di Sidoarjo (96,05%) lebih rendah daripada tingkat kesembuhan nasional (97,30%).* ***Tujuan:*** *Penelitian ini bertujuan untuk mengidentifikasi waktu kesembuhan dan faktor-faktor yang mempengaruhi waktu kesembuhan pada pasien COVID-19 di Sidoarjo.* ***Metode:*** *Metode life-table digunakan untuk melakukan analisis ketahanan hidup pada data dari dashboard NAR COVID-19 di Sidoarjo dari 3 Januari hingga 4 Agustus 2022 yang melibatkan 20.662 responden. Kelompok usia, jenis kelamin, status perawatan, dan tujuan pemeriksaan dianalisis.* ***Hasil:*** *Mayoritas pasien COVID-19 adalah perempuan (50,30%) berusia 26-<46 tahun (46,24%). Sebagian besar pasien (64,74%) memilih untuk melakukan isolasi mandiri, dan 63,34% dinyatakan positif COVID-19. Rata-rata, pasien sembuh dalam waktu tujuh hari setelah diagnosis. Uji statistik Wilcoxon (Gehan) menghasilkan nilai p-value kurang dari 0,001 untuk semua faktor pada tingkat signifikansi 0,05, yang menunjukkan adanya perbedaan yang signifikan dalam distribusi waktu kelangsungan hidup. Kelompok usia dengan median waktu sembuh terpendek adalah 6-<12 tahun yaitu 7,03 hari, sedangkan laki-laki memiliki median waktu sembuh 7,66 hari. Pasien yang melakukan isolasi mandiri memiliki median waktu sembuh 7,16 hari, dan pasien yang diuji untuk tujuan kontak erat memiliki median waktu sembuh 7,65 hari.* ***Simpulan:*** *Median waktu sembuh pasien COVID-19 pasca diagnosis adalah tujuh hari. Terdapat perbedaan yang signifikan dalam waktu sembuh di antara pasien COVID-19 berdasarkan kelompok usia, jenis kelamin, status perawatan, dan tujuan pemeriksaan.*

INTRODUCTION

On March 11, 2020, coronavirus disease 19 (COVID-19) was declared a global pandemic by the World Health Organization (WHO) (1). Since May 2, 2020, it had been affecting Indonesia (2). As of November 24, 2022, Indonesia has confirmed 6,627,538 cases of COVID-19, with 159,524 reported deaths (case fatality rate/CFR = 2.41%) and 6,403,551 individuals having recovered (case recovery rate/CRR = 96.62%) (3,4). The 2020 Health Profile of East Java Province reported a total of 84,152 confirmed cases of COVID-19 across various regencies and cities, including 19 cases among ship crew members. These cases were identified while the ships were in the waters of East Java Province (1).

Sidoarjo Regency is the second-highest cumulative contributor to confirmed cases of COVID-19 in East Java Province from 2020 to 2022. As of October 15, 2022, the case recovery rate (CRR) in Sidoarjo was 96.05%, which was lower than the national recovery rate of 97.30%. Therefore, it is essential to make efforts to improve the recovery rate in Sidoarjo.

In 2022, researchers conducted an analysis of health issues in Sidoarjo Regency. The analysis highlighted COVID-19 as a prominent health concern that requires immediate attention as a top priority. Mitigation efforts against COVID-19 must persist, including the implementation of epidemiological surveillance activities aimed at curtailing the spread of the disease. These efforts serve as valuable information for local governments, public health authorities, and hospitals to manage the risks associated with COVID-19 (5).

Until 2022, Indonesia continues to face the impacts of the COVID-19 pandemic. The COVID-19 Task Force has issued preventive measures in response to the ongoing increase in daily COVID-19 cases in Indonesia. The pandemic has significantly affected the country, leading to the high demand for healthcare services that require substantial budgets. The provinces most severely affected include Jakarta, West Java, and Central Java. The government has implemented various responses, including regional restrictions and vaccination campaigns, to mitigate the spread of the virus and its impact on public health. The situation is dynamic, so individuals must stay

informed about the latest developments and adhere to public health guidelines (6,7).

The duration of an individual's COVID-19 infection is significant as it can affect the genetic mutations of the SARS-CoV-2 virus, resulting in changes to the virus's structure and spike protein. These mutations can impact diagnostic accuracy, viral immunity, management, and the development of COVID-19 vaccines. Changes to the spike protein of COVID-19 can impact transmission and severity, leading to mismatches between the immune system, symptoms, and diagnostic results. This could result in the emergence of new, more easily transmissible and aggressive virus variants that could exacerbate the pandemic (8).

Research focused on survival is crucial for understanding COVID recovery time and identifying factors that influence it. This knowledge can enhance the effectiveness of COVID-19 pandemic management and mitigation efforts by aligning programs with specific needs (5), including predicting the risk of death (9–12). The results of survival analysis can assist in developing better approaches for diagnostic enforcement, management, and COVID-19 vaccine development, thereby improving efforts to combat the pandemic. This study aims to identify the recovery time and its influencing factors among COVID-19 patients in Sidoarjo Regency.

METHODS

This study aims to conduct survival analysis using the life table method, also known as actuary (Cutler-Ederer) in alternative analyses. The life table is a table used to calculate the probability of survival from observed events in each specific time interval by determining the desired time intervals (13).

This study used secondary data from the COVID-19 New All Record (NAR) Dashboard of the Health Office of Sidoarjo Regency, covering the period from January 3 to August 4, 2022, and included 20,662 cases that met the inclusion criteria. These criteria required complete data on age group, sex, treatment status, and testing purpose, making them eligible as samples. Halimatuzzahro' et al (14) classified people into age groups.

This study employed survival analysis to assess the duration of illness and the attainment of recovery. The statistical significance of differences in recovery time based on research variables was evaluated using the Wilcoxon (Gehan) test, with the comparison levels of the first factor selected by pairwise comparisons. A two-tailed test with a significance level of less than 0.05 was considered statistically significant.

This study received approval from the Research Ethics Committee of the Faculty of Dental Medicine Health Research of Universitas Airlangga on December 29, 2023 with a reference number 1429/HRECC.FODM/XII/2023.

RESULTS

Table 1 presents the characteristics of the 20,662 individuals with COVID-19 in the sample. Table 1 shows that the majority of COVID-19 patients in Sidoarjo Regency were females (50.30%) aged 26-<46 years (46.24%). Most of them underwent self-isolation treatment (64.74%) and screening testing (63.34%).

Table 1
Characteristics of COVID-19 Patients in Sidoarjo Regency, January 3-August 4, 2022 (n = 20,662)

Characteristic	n	%
Age Group		
0-<6 years	557	2.70
6-<12 years	470	2.27
12-<26 years	4,870	23.57
26-<46 years	9,554	46.24
46-<66 years	4,474	21.65
=>66 years	737	3.57
Sex		
Male	10,268	49.70
Female	10,394	50.30
Treatment Status		
Self-isolation	13,377	64.74
Hospitalized	7,285	35.26
Testing Purpose		
Close Contact	1,974	9.55
Screening	13,087	63.34
Suspected	5,601	27.11

Source: COVID-19 NAR Dashboard, Health Office of Sidoarjo Regency, 2022

Probability of Survival

The importance of survival probability in this study is its correlation with the probability that COVID-19 patients would achieve a recovery. During the period from January 3 to August 4, 2022, 20,600 individuals (99.70%) recovered. Most patients recovered within seven days after being diagnosed with COVID-19 (19.70%). The fastest recovery time was two days (8.90%), while the longest was 36 days (0.01%). The time

intervals in the life table analysis were determined based on the period with the highest recovery rate, which was seven days.

Table 2 presents the results of the survival analysis using the life table method. The data indicate that the median survival time for COVID-19 patients in Sidoarjo Regency was 7.85 days. The "interval start time" column denotes the time intervals used for the life table analysis, while the "number entering interval" column represents the number of patients who remained ill at the beginning of the interval. The "number withdrawing during interval" column signifies the number of patients who passed away, while the "number of terminal events" column indicates patients who achieved recovery.

Table 2 shows that the initial time interval spanned from day 0 and to day 6. During this interval, 20,662 cases were sampled, out of which 9,000 cases recovered by day 6, and 32 cases resulted in mortality. The probability of recovery during this interval was 0.062, resulting in a survival rate of 6.2% for COVID-19 patients in Sidoarjo Regency.

Table 2
Results of Survival Analysis Using the Life Table Method

Interval Start Time (Days)	Number Entering Interval	Number Withdrawing during Interval	Number of Terminal Events	Probability Density	Hazard Rate
0	20,662	32	9,000	.062	.080
7	11,630	24	10,926	.076	.250
14	680	4	559	.004	.200
21	117	0	103	.001	.220
28	14	1	12	<.001	.230
35	1	1	0	<.001	.000

a. The median survival time is 7.85

The second time interval spanned from day 7 to day 13. During this interval, 11,630 cases were sampled, out of which 10,926 cases recovered by day 13, and 24 cases resulted in mortality. The probability of recovery during this interval was 0.076, resulting in a survival rate of 7.6% for COVID-19 patients in Sidoarjo Regency. The third time interval spanned from day 14 to day 20. During this interval, 680 cases were sampled, out of which 559 cases recovered and four cases resulted in mortality. The probability of recovery during this interval was 0.004, resulting in a survival rate of 0.4% for COVID-19 patients in Sidoarjo Regency.

The fourth time interval spanned from day 21 to day 27. During this interval, 117 cases were sampled, out of which 103 cases recovered and zero cases resulted in mortality. The probability of recovery during this interval was 0.001, resulting in a survival rate of 0.1% for COVID-19 patients in Sidoarjo Regency. The fifth time interval spanned from day 28 to day 34. During this interval, 14 cases were sampled, out of which 12 cases recovered and one case resulted in mortality. The probability of recovery during this interval was 0.0003, resulting in a survival rate of 0.3% for COVID-19 patients in Sidoarjo Regency.

The sixth time interval was on day 35. During this interval, one case was sampled, out of which zero cases recovered and one case resulted in mortality. The probability of recovery during this interval was 0.0002, resulting in a survival rate of 0.02% for COVID-19 patients in Sidoarjo Regency. The second time interval (day 7 to day 13) had the highest number of recovered cases and the highest survival rate of 7.6% compared to other time intervals.

Survival Analysis of Successfully Recovered COVID-19 Patients Based on Age Group, Sex, Treatment Status and Testing Purpose

Table 3 shows that males aged between 6 and 11 years who underwent self-isolation and close contact testing had the shortest median survival time in each category, namely 7.66, 7.03, 7.16, and 7.65 days, respectively.

Table 4 presents the Wilcoxon (Gehan) analysis of the significance of survival time distribution based on sex and treatment status in COVID-19 patients in Sidoarjo Regency. It shows that male COVID-19 patients in Sidoarjo Regency recovered faster than female patients. This difference is statistically significant ($p < .001$). Patients who underwent self-isolation recovered faster compared to those treated in hospitals. This

difference is also statistically significant ($p < .001$).

Table 3
Median Survival Time based on Age Group, Sex, Treatment Status, and Testing Purpose

Category	Median Time (days)
Age Group	
0-<6 years	7.97
6-<12 years	7.03
12-<26 years	7.11
26-<46 years	7.61
46-<66 years	8.67
=>66 years	10.30
Sex	
Male	7.66
Female	8.02
Treatment Status	
Self-isolation	7.16
Hospitalized	8.87
Testing Purpose	
Close Contact	7.65
Screening	7.70
Suspected	8.28

Table 4
Significance of Survival Time Distribution based on Sex and Treatment Status in COVID-19 Patients in Sidoarjo Regency

Category	p-value
Sex	<.001
Treatment Status	<.001

Table 5 presents the distribution of survival time among COVID-19 patients in Sidoarjo Regency based on age group and testing purpose. The Wilcoxon (Gehan) statistical test revealed that each age group and testing purpose had a p-value of less than 0.001 (p-value < $\alpha = 0.05$), indicating significant differences in the distribution of survival time among COVID-19 patients in Sidoarjo Regency in each subcategory. If the significance value was less than 0.05, significant differences were found in the distribution of survival time among COVID-19 patients in Sidoarjo Regency within the subcategories. However, if the p-value was more than 0.05, no significant differences were found in the distribution of survival time among COVID-19 patients in Sidoarjo Regency within the subcategories. Table 5 shows that most subcategories within the age group have p-values of less than 0.05. However, a correlation was found, indicating that the distribution of survival time between age groups of COVID-19 patients had p-values of more 0.05. For example, the comparison between the age group of 26-<46 years and the age group of 6-<12 years in the Wilcoxon (Gehan) statistical test yielded a p-value of 0.276. Similarly, the Wilcoxon (Gehan) statistical test yielded a p-value of 0.412 for the comparison between the age group of 12-<26 years and the age group of 6-<12 years. Therefore, at a significance level of 0.05, it can be concluded that no significant differences were found in the distribution of survival time among COVID-19 patients in Sidoarjo Regency between the age group of 26-<46 years and the age group of 6-<12 years, as well as between the age group of 12-<26 years and the age group of 6-<12 years.

The testing purpose variable, with a p-value of more than 0.05, refers to COVID-19 patients undergoing testing for screening purpose compared to those undergoing testing for close contact purpose, with a value of 0.075. Therefore, it can be concluded that no significant difference was found in the distribution of survival time among COVID-19 patients in Sidoarjo Regency between those undergoing testing for close contact and those for screening purposes.

DISCUSSION

The results of the study suggested that COVID-19 patients took an average of seven days to recover, with the quickest recovery observed in two days and the longest in 36 days. Furthermore, the survival probability for COVID-19 patients showed a median survival time of 7.85. These findings were different from the study conducted by Sulantari and Hariadi which found that COVID-19 patients in Banyuwangi Regency recovered in 16 days (9). Another study conducted by Multazamiyah et al (15) in Bandar Lampung obtained a median recovery time of 15 days, with a median survival time of 17.30 days.

The data shows that most COVID-19 patients in Sidoarjo Regency had mild symptoms, making self-isolation sufficient and affecting the speed of recovery. The recovery period for patients with mild symptoms in seven days supports the 2020 COVID-19 control guidelines from the Ministry of Health, which suggests that patients with mild symptoms have a recovery time of seven days (2). A robust immune system response to the virus can influence a COVID-19 patient to experience mild symptoms (16). In addition, proper medical

treatment and care can affect symptoms and recovery time (10,16). Other factors that may affect the recovery time of COVID-19 patients include age group, sex, and the type of healthcare facility (17–19).

Table 5
Significance of Survival Time Distribution Based on Age Group and Testing Purpose in COVID-19 Patients in Sidoarjo Regency

Category	Subcategory	*p*-value
Age Group		**< .001**
0-<6 years	6-<12 years	.006
	12-<26 years	< .001
	26-<46 years	.006
	46-<66 years	< .001
	=>66 years	< .001
6-<12 years	0-<6 years	.006
	12-<26 years	.412
	26-<46 years	.276
	46-<66 years	< .001
	=>66 years	< .001
12-<26 years	0-<6 years	< .001
	6-<12 years	.412
	26-<46 years	< .001
	46-<66 years	< .001
	=>66 years	< .001
26-<46 years	0-<6 years	< .001
	6-<12 years	.276
	12-<26 years	< .001
	46-<66 years	< .001
	=>66 years	< .001
46-<66 years	0-<6 years	< .001
	6-<12 years	< .001
	12-<26 years	< .001
	26-<46 years	< .001
	=>66 years	< .001
=>66 years	0-<6 years	< .001
	6-<12 years	< .001
	12-<26 years	< .001
	26-<46 years	< .001
	46-<66 years	< .001
Testing Purpose		**< .001**
Suspected	Screening	< .001
	Close Contact	< .001
Screening	Suspected	< .001
	Close Contact	.075
Close Contact	Suspected	< .001
	Screening	.075

This study found statistically significant differences in recovery time among different age groups of COVID-19 patients in Sidoarjo Regency. The age range of patients varied from two months to 94 years, with the most frequent age group being 26-<46 years (46.24%). The age group with the shortest median survival time was 6-<12 years, with a recovery time of 7.03 days, rounded to seven days. Meanwhile, the age group with the longest median survival time was =>66 years, with a recovery time of 10.30 days, rounded to 10 days. These findings support the results of previous studies which consistently indicate that in COVID-19 patients, older age is associated with a longer recovery time compared to younger age (17,20,21). Therefore, age is a significant predicting factor in determining the recovery time of COVID-19 patients. This may be attributed to the fact that older patients often have comorbidities, which can result in more severe symptoms and longer recovery times compared to patients without comorbidities. Studies conducted in Ethiopia found that comorbidities significantly influenced the recovery time of COVID-19 patients (19,20,22). Another study conducted in Lamongan Regency found a significant correlation between COVID-19 patients aged above 60 years, those with comorbidities, and the occurrence of death (23).

In Sidoarjo Regency, COVID-19 patients were predominantly female (50.30%). The distribution of recovery time differed significantly between male and female patients. It is important to note that the median survival time for males is lower, with a recovery time of 7.66 days, rounded to seven days. The recovery period based on sex shows inconsistent results across studies. A study conducted at King Abdulaziz Medical City in Jeddah, found that the female COVID-19 patients had a faster recovery time (10.95 days) than male patients (11.75 days) (17). Similarly, a study in South Central Ethiopia found that male COVID-19 patients had a longer recovery time compared to female patients (24). A study conducted in Assosa in Ethiopia concluded that male COVID-19 patients had a longer recovery time than their female counterparts (21). In contrast, a study conducted in Attock in Pakistan found that the average recovery time from COVID-19 was 18.89 days for males and 19.02 days for females (25). In addition, a study conducted in Padang observed that females tended to recover more quickly than males, although the difference was not statistically significant (26). These inconsistent results indicate that the recovery time of COVID-19 patients may vary depending on factors such as age, clinical conditions, and medical management (27).

The majority of COVID-19 patients underwent self-isolation, accounting for 64.74% of cases. The recovery time for COVID-19 patients could vary depending on whether they undergo self-isolation or are hospitalized. Significant differences were found in the distribution of survival time between COVID-19 patients who were hospitalized and those who underwent self-isolation. Patients undergoing self-isolation had a shorter median survival time, with a recovery period of 7.16 days, rounded to seven days. Most COVID-19 patients experiencing mild symptoms could recover within days, while for others, it took weeks or even months (28).

A comparative study between centralized isolation and home isolation (self-isolation) revealed that home isolation (self-isolation) resulted in faster recovery, potentially due to reduced stress associated with depression, anxiety, and health-related concerns for centrally isolated COVID-19 patients (29). Furthermore, predictors of longer recovery in centrally isolated COVID-19 patients include the presence of fever, comorbidities, and age (20). For individuals with severe illnesses, including healthcare workers and those with immunodeficiency disorders, a longer duration of isolation and recovery time is required (30).

This study found that 63.34% of the patients underwent testing for screening purposes. Significant differences in recovery time were observed among COVID-19 patients with testing for screening, close contact, and suspect purposes in Sidoarjo Regency. It is known that patients tested for close contact purpose had the shortest median survival time, with a recovery time of 7.65 days, rounded to seven days. This indicates that testing for close contact purpose is beneficial for promptly obtaining a definitive diagnosis, allowing patients to receive treatment before the condition worsens.

Research Limitations

This study used secondary data, which has inherent limitations. Issues related to data completeness during the collection process may restrict the types of variables.

CONCLUSION

The characteristics of COVID-19 patients in Sidoarjo Regency indicates that the majority were females (50.30%) aged 26-<46 years (46.24%). Most patients underwent self-isolation (64.74%) and were identified as COVID-19 positive through screening (64.74%). The median recovery time for COVID-19 patients was seven days from the beginning of treatment. Significant differences were observed in the survival time of COVID-19 patients in Sidoarjo Regency in 2022 based on age groups, sex, treatment status, and testing purpose.

CONFLICT OF INTEREST

The authors declare no conflicts of interest related to the publication of this study.

AUTHOR CONTRIBUTIONS

All authors actively participated in conducting this study as well as developing and writing the article and take responsibility for its content, including the concept, design, analysis, and revision. NF: Data collection and analysis, discussion, initial draft writing. ACH: Data curation, methodology, supervision, conceptualization, discussion. RG: Discussion. SSH: Data collection and analysis, discussion.

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REFERENCES

1. Kemenkes RI. Keputusan Menteri Kesehatan Republik Indonesia Nomor HK.01.07/MENKES/413/2020 Tentang Pedoman Pencegahan Dan Pengendalian Coronavirus Disease 2019 (COVID-19). 01.07/MENKES/413/2020 Jakarta; 2020.
2. Kemenkes RI. Pedoman Pencegahan Pengendalian Coronavirus Disease (COVID-19). Jakarta; 2020.
3. WHO. Coronavirus disease (COVID-19) Weekly Epidemiological Updates and Monthly Operational Updates. 2023.
4. KFF. Global COVID-19 Tracker. 2023.
5. Farakhin N, Hendrati LY, Hadi SS, Sistyaningsih M. Analisis Masalah Kesehatan di Kabupaten Sidoarjo Jawa Timur (Study Pada Masa Pandemi COVID-19). Malahayati Nurs J. 2023 Nov;5(11):3786–800.

6. Djalante R, Lassa J, Setiamarga D, Sudjatma A, Indrawan M, Haryanto B, et al. Review and analysis of current responses to COVID-19 in Indonesia: period of January to March 2020. Prog Disaster Sci. 2020;6:1–9.
7. Hanifah L, Siregar KN. COVID-19 in Indonesia: Is There a Shift from Pandemic to Endemic? Kesmas J Kesehat Masy Nas (National Public Heal Journal). 2022 Jul;17(sp1):4–10.
8. Anwari F, Setiawan F, Nurdianto AR, Budhy TI, Tena HA, Puspitasari H. An Analysis of Genetic Risk Factors (Chromosomes 3 and 9) and Mutation of Spike COVID-19 in the Severity and Transmission Factor. J Int Dent Med Res. 2022;15(2):885–90.
9. Sulantari S, Hariadi W. Analisis Survival Waktu Sembuh Pasien COVID-19 Di Kabupaten Banyuwangi. Transform J Pendidik Mat dan Mat. 2020 Dec;4(2):375–86.
10. Putri FM, Ratih ID. Analisis Survival Lama Waktu Sembuh Pasien COVID-19 di Rumah Sakit Lapangan Kogabwilhan II Surabaya. J Sains dan Seni ITS. 2022;11(2).
11. Hidayat R, Sam M, Wardi RY, Iskandar MI. Pemodelan Survival Pasien COVID-19 dengan Hazard Non-Proporsional. Euler J Ilm Mat Sains dan Teknol. 2022;10(1):120–30.
12. Widyasari R, Imam MC, Rachmawati R, Sari RF. Survival Analysis of COVID-19 Patients Based on Time of Recovery. J Mat Stat dan Komputasi. 2022;18(3):456–74.
13. Harlan J. Analisis Survival. Gunadarma. Depok: Gunadarma; 2017. 89 p.
14. Halimatuzzahro' F, Arisanti AS, Arifi RA, Saifudin T, Ana E, Kurniawan A. The effect of age and gender on COVID-19 recovery duration. AIP Conf Proc. 2023 Jan;2554(1):30004.
15. Multazamiyah SA, Sary L, Aryastuti N. Analisis Survival Waktu Sembuh Pasien COVID-19 di Rumah Sakit Pertamina Bintang Amin Bandar Lampung. J Med Surg Concerns. 2021 Oct;1(2):73–82.
16. Shalzaviera Azniatinesa, Adisasmita; AC, Ronoatmodjo S, Robinson M. Faktor-Faktor yang Berhubungan dengan Lama Sakit Sampai Sembuh pada Pasien COVID-19 yang Dirawat di RSUD Kota Bogor, Indonesia, Jan-Desember 2021: Analisis Survival = Time to Recovery from COVID-19 and Its Associated Factors among Patients Hospitalized in. Universitas Indonesia; 2022.
17. Al-Thaqafy MS, Batahaf R, Bahakeem R, Batarjee R, Mubaraki W, Alsaedi A, et al. Factors Affecting Confirmed COVID-19 Patient's Recovery Time at King Abdulaziz Medical City, Jeddah. Cureus. 2023 Jan;15(1).
18. Tirore LL, Nadamo SA, Derilo HT, Erkalo D, Sedore T, Tadesse T, et al. Time to Recovery from COVID-19 and Its Predictors Among Patients Admitted to Treatment Centers of Southern Nations Nationalities and Peoples Region (SNNPR), ETHIOPIA: Multi-Center Retrospective Cohort Study. Infect Drug Resist. 2022;15:3047–62.
19. Habtamu Tamiru D, Gedef Azene A, Wudie Tsegaye G, Mulatu Mihretie K, Hunegnaw Asmare S, Arega Gete W, et al. Time to Recovery from COVID-19 and Its Predictors in Patients Hospitalized at Tibebe Ghion Specialized Hospital Care and Treatment Center, A Retrospective Follow-Up Study, North West Ethiopia. Glob Heal Epidemiol genomics. 2023;2023.
20. Tolossa T, Wakuma B, Gebre DS, Atomssa EM, Getachew M, Fetensa G, et al. Time to recovery from COVID-19 and its predictors among patients admitted to treatment center of Wollega University Referral Hospital (WURH), Western Ethiopia: Survival analysis of retrospective cohort study. PLoS One. 2021;16(6 June):1–12.
21. Kassie MZ, Gobena MG, Alemu YM, Tegegne AS. Time to recovery and its determinant factors among patients with COVID-19 in Assosa COVID-19 treatment center, Western Ethiopia. Pneumonia 2023 151. 2023 Nov;15(1):1–10.
22. Arshad M, Jaleel H, Iqbal SP, Asif M, Ali M, Mubarak M, et al. Comorbidities Affect the Recovery Rate of COVID-19 Patients - A Retrospective Study in Lahore, Pakistan. Med Res Arch. 2022 Sep;10(9).
23. Nadzifah YN, Hidajah AC. The relationship of diabetes mellitus and

hypertension with mortality in COVID-19 patients. J Berk Epidemiol [Internet]. 2022;10(2):219–26. Available from: https://e-journal.unair.ac.id/JBE/article/view/26489/21198

24. Kaso AW, Hareru HE, Kaso T, Agero G. Time to recovery from COVID-19 and its associated factors among patients hospitalized to the treatment center in South Central Ethiopia. Environ Challenges (Amsterdam, Netherlands). 2022 Jan;6:100428.
25. Ejaz R, Ashraf MT, Qadeer S, Irfan M, Azam A, Butt S, et al. Gender-based incidence, recovery period, and mortality rate of covid-19 among the population of district attock, Pakistan | Incidência baseada em gênero, período de recuperação e taxa de mortalidade de covid-19 entre a população do distrito de attock, paq. Brazilian J Biol. 2023;83:1–7.
26. Fitriani PR, Putra AE, Asyari A. Hubungan Jenis Kelamin Dan Usia Pasien Positif COVID-19 Dengan Tingkat Kecepatan Konversi Di Kota Padang Tahun 2020. J Ilmu Kesehat Indones. 2022;3(2):117–24.
27. Ibitoye OS, Olasunkanmi YA, Olowolafe TA, Olabode AT, Salawu MM, Afolabi RF. Predictors and time to recovery from COVID-19 among patients attended at the treatment centers in Ekiti State, South West, Nigeria. Pan Afr Med J. 2022 May;42(18).
28. Health Direct. COVID-19 isolation and recovery. 2023.
29. Ju Y, Chen W, Liu J, Yang A, Shu K, Zhou Y, et al. Effects of centralized isolation vs. home isolation on psychological distress in patients with COVID-19. J Psychosom Res. 2021 Apr;143:110365.
30. CDC. Ending Isolation and Precautions for People with COVID-19: Interim Guidance. 2023.