

ORIGINAL RESEARCH

The trend of mortality rates following hospitals downgrading and closures due to outbreak of COVID-19 in Fars province: A comparative cohort study

Mohammad Javad Fallahi^{1,2} | Sarvin Seifbehzad³ | Mehran Fereidooni⁴ |
Amirmohammad Farrokhi⁵ | Keivan Ranjbar^{1,3} | Reza Shahriarirad^{1,3} 

¹Thoracic and Vascular Surgery Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

²Department of Internal Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

³Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran

⁴Legal Medicine Research Center, Legal Medicine Organization, Tehran, Iran

⁵Trauma Research Center, Shahid Rajaei (Emtiaz) Trauma Hospital, Shiraz University of Medical Sciences, Shiraz, Iran

Correspondence

Reza Shahriarirad, Thoracic and Vascular Surgery Research Center, Shiraz University of Medical Sciences, Shiraz, Iran.

Email: r.shahriari1995@gmail.com and Tavsrc@sums.ac.ir

Abstract

Background and Aims: Hospitals are one of the most important healthcare centers for providing the patients with different medical needs. Several different factors might cause hospitals to downgrade their services or departments or close down overall. One of the most multifaceted reasons for hospital downgrading or closure is infectious disease outbreaks. In this regard, we aimed to evaluate the effects of hospital closure and downgrading due to the COVID-19 pandemic on the mortality rate of the people residing in Fars province, Iran.

Methods: We gathered mortality information, including the cause of death, age, sex, place, and time of death of all deceased cases occurring during a period of 3 years, from February 20, 2018 to March 2021 from the forensic medicine and also the Department of Biostatistics in Shiraz University of Medical Sciences.

Results: A total of 71,331 deaths have been reported since 2018 through the first quarter of 2021, with 57.9% of total mortality cases attributed to male gender. The total mortality counts ranged from 4229 to 9809 deaths per quarter, from which the minimum rate was reported in the first quarter of 2018 and the maximum in the fourth quarter of 2020. Based on the causes of death, diseases of the circulatory system were shown to be the all-time most frequent cause of death, accounting for a total of 42.8% of recorded deaths, followed by neoplasms (9.77%) and diseases of the respiratory system (9.45%).

Conclusion: Although the large number of deaths at the time of the pandemic are immediately due to COVID-19 infection, deaths due to a notable number of other causes have had a significant increase which, along with the specific trend of place and causes of death, shows that the downgrading and closure of hospitals have had a significant impact on overall population mortality.

KEYWORDS

COVID-19, hospital, mortality, pandemic, policy

2020 which witnessed a rise in deaths by injury/poisoning, due to a surge in methanol poisonings.

Analyses of BCOD/ICOD show that COVID-19, like neoplasms, is mostly the initiator of the cascade that results in death. On the other hand, diseases of the circulatory system, diseases of the respiratory system, and certain infections have ratio values less than 1, which shows they are mostly the ultimate cause of death.

Among the other published reports on the applied policies and downgrading, one case was mentioned from a private transplant referral hospital in our province.⁹ The main findings demonstrated that the COVID-19 pandemic had a discernible impact in terms of postponing surgery and raising hospital expenses and workload. However, by implementation of proper policies, early diagnosis for COVID-19, and application of the required treatment and preventive protocols to protect the patients, the center was able to deliver satisfactory medical services for patients and limit the spread of infection.⁹ In a report from the New York hospitals in the United States, the result of the collaboration across private, public, community, and federal hospital systems was able to develop multiple strategies for communication, surge capacity, clinical guidelines, and staff wellness during the COVID-19 pandemic.¹⁷ However, Shi et al. from Korea state that while tertiary hospitals are crucial for treating both COVID-19 patients and patients without the virus, hospital staff must safeguard themselves against unforeseen in-hospital transmission. For safeguarding tertiary hospitals and their staff during the COVID-19 epidemic, a comprehensive response must be implemented.¹⁸ This can also be evident in the reports in Iran as well, demonstrating a high rate of COVID-19 infection among healthcare workers.^{19,20} Through applying proper hospital policies, better management of healthcare workers can be achieved to avoid high exposure and burnout during these stressful circumstances. However, these policies should be assessed from a broader viewpoint while considering the impact of hospital downgrading and closure on the overall mortality rates and concurring events. These applied implantations, although imperfect, should be evaluated in various settings to provide experience and data for future policymakers. There are few similar studies conducted at the time of the pandemic. In South Korea, a study showed an increase in inpatient mortality any time there was an emergency department closure. These findings are in the same line with those of our study.²¹

Chronic kidney disease patients who were followed and evaluated in India showed a significant increase in morbidity and mortality due to limited or delayed access to dialysis services. In our study, dialysis patients were not separately assessed, but deaths due to diseases of the genitourinary system were shown to have a decreasing trend which might be due to a difference in healthcare systems in Iran and India; for example, there are dialysis units which are not strictly dependent on hospitals in Iran, which provide the chronic kidney disease patients with care, so their sessions are not delayed at the times of hospital downgrading.²²

There are some limitations in our study. First, since downgrading and hospital closure and corresponding events have been rarely reported in the literature; also, in our country we were unable to

compare our implanted policies and outcomes with other similar events, thus making our report merely descriptive for future policymakers. Another limitation is that we were unable to assess the financial burden and other aspects of hospital downgrading and closure, which could all affect the implementation of these measures. Although our study focused on a vital aspect, which was the mortality rates, aside from providing data on the results and burden of the COVID-19 pandemic and applied measures, we were able to evaluate the frequency and trends in mortality rates in our country.

5 | CONCLUSION

Hospital closure due to the COVID-19 pandemic has had a major effect on mortality rates, while also affecting the trend of mortality along with the admission status in Fars province. However, long-term evaluation after the reopening of hospitals is warranted to evaluate the exact effect of these imposed conditions. Evaluation of the long-term impact of hospital closure on disease-related mortalities should be continuously assessed to better determine the depths of the impact of such conditions. On the other hand, due to different outcomes in certain specific fields with other countries, further comparisons of the impact of hospital closure policies in Iran with other countries and also evaluation of the effect of different imposed policies during hospital closure on mortality rates would be beneficial in reaching a better cost-benefit ratio and optimization of such policies.

AUTHOR CONTRIBUTIONS

Mohammad Javad Fallahi: Conceptualization; resources. **Sarvin Seifbehzad:** Data curation; investigation; validation; writing—original draft. **Mehran Fereidooni:** Investigation; methodology; resources. **Amirmohammad Farrokhi:** Data curation; formal analysis. **Keivan Ranjbar:** Supervision; writing—review and editing. **Reza Shahriarirad:** Conceptualization; data curation; formal analysis; investigation; methodology; project administration; supervision; writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

SPSS data of the participants can be requested from the authors.

ETHICS STATEMENT

The present study was approved by the medical ethics committee of the academy (Ethical Code: IR.SUMS.REC.1399.091). The permission