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Clinical and epidemiological features of covid-19 deaths in Behbahan county, southwestern Iran, in 2020-2022

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Abstract

Background: The *Coronaviridae* family is responsible for coronavirus disease 2019 (COVID-19), which has become a global health threat. In Iran, the first confirmed case of COVID-19 was reported in Qom on February 19, 2020. The rapid spread of the virus led to a significant number of fatalities, highlighting the need for a detailed analysis of demographic, epidemiological, and clinical factors to enhance public health measures. Therefore, this study aimed to investigate the epidemiological, clinical, and demographic features of COVID-19 deaths in Behbahan County, southwestern Iran, in 2020-2022.

Methods: In the present cross-sectional study, patients diagnosed with COVID-19 who died from the infection in all hospitals of Behbahan were analyzed. We used a questionnaire including data about the demographic, epidemiologic, and clinical of each patient. Finally, all the results were analyzed by SPSS v. 21.

Results: We enrolled 437 polymerase chain reaction (PCR)-confirmed COVID-19 cases from this period, of whom 61% were men. The highest mortality rate was among those aged 61 to 70 years (27%), and the lowest number was among children and adolescents below 20 years old. The results of the survey also showed that there were 3 main risk factors: diabetes (28%), cardiovascular diseases (25%), and high blood pressure (17%), which contributed to death in these groups. The highest mortality rate occurred in July 2021, followed by June 2020.

Conclusion: There was a significant correlation between the age of the patients, the history of at least 1 chronic disease, and the mortality rate in infected patients. For this reason, it is crucial to implement precautionary procedures to reduce the number of deaths among infected people. Thus, the results of the present study can depict a better picture of the patients' condition in Behbahan and provide insight into future approaches.

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Highlights

What is current knowledge?

Due to the mysterious nature of COVID-19 and insufficient studies about the disease, it is necessary to conduct more studies to investigate the clinical and epidemiological characteristics of the disease.

What is new here?

The findings showed that there are 3 main risk factors: diabetes, cardiovascular diseases, and high blood pressure, which contributed to death in these groups.

Introduction

The novel SARS-CoV-2 virus is a single-strand, positive-sense RNA virus belonging to the *Beta coronavirus* genus of the *Coronaviridae* family (1). SARS-CoV-2 originally emerged in Wuhan, China, in late 2019 (2). This virus has a different spectrum of symptoms, from a simple cold to a dangerous and chronic infection like COVID-19, which is the most contagious pandemic in the last century (3). The coronavirus disease has drawn a lot of attention from clinical researchers in pathogenies, pathology, treatment, and vaccine production areas (4). COVID-19, in most cases, causes problems for the upper respiratory tract; however, this virus can also affect the inner respiratory tract (5,6). Current evidence suggests that the new coronavirus is transmitted through contact, droplets, airborne, oral-fecal, and mother-to-child routes. Moreover, patients can transmit the virus to others during incubation. Infection with SARS-CoV-2 primarily causes fever, cough, tiredness, loss of taste or smell, bone and muscle pain, and shortness of breath (7,8). According to the World Health Organization, COVID-19 has infected more than 634 million and killed more than 6 million people worldwide. Regarding Iran, it is reported that the number of infected people was about 7.5 million, and 146 000 died as a result of this infection (9). Due to the epidemic of COVID-19 and the speed of its spread in the world, genetic changes, and the creation of different strains, researchers have started many studies on different aspects of the disease and, so far, many studies in the fields of epidemiology, pathogenesis, diagnosis, treatment, and vaccination have been conducted (10). Still, these studies seem insufficient due to the mysterious nature of the disease, and it is necessary to conduct more studies to investigate the clinical and epidemiological characteristics of the disease. The present study aimed to present the demographic, epidemiological, and clinical characteristics of the deaths related to COVID-19 in Behbahan, a city located in the southwest of Khuzestan Province (Iran) with a population of over 200 000 in 2020 to 2022. It is expected to show an accurate picture of the condition of the disease, and the results can be used to help health and treatment institutions for future planning.

Methods

Study area

Behbahan is one of the 27 counties of Khuzestan Province in southwestern Iran. The capital of the county is Behbahan. The county is subdivided into 3 districts: Central, Tashan, and Zeydun. Also, it consists of 4 cities: Behbahan, Mansuriyeh, Tashan, and Sardasht. Behbahan has a land area of around 3,195 km^2 and is in the southeast of Khuzestan Province at approximately 30° 35′ 45″N and 50° 14′ 30″E. The population of this county is estimated at 300 000 (11,12).

Patient data collection

In this cross-sectional study, data from all patients who died of COVID-19 were obtained from all hospitals in Behbahan County (Khuzestan Province, Iran) between March 2020 and March 2022. In the next step, demographic data (Age, sex, etc.) and epidemiological and clinical information (The history of chronic diseases) were collected from patients. Finally, the obtained data were analyzed with SPSS v. 21 (IBM Corp., Armonk, NY, USA) to assess the factors contributing to mortality.

Results

The findings showed that 437 deaths occurred during the entire study period due to COVID-19, of which 379 cases (91%) were in Behbahan and 40 cases (9%) were in Aghajari. Moreover, out of 437 cases of death, 267 patients (61%) were men and 170 patients (39%) were women. The highest number of deaths was seen in patients aged 71-80 years (24%), and the lowest number was among the 1-10 and 11-20 age groups, which was below 1% (Figure 1). According to the age grouping of the Ministry of Health and Medical Education of the Islamic Republic of Iran, middle-aged patients had the highest mortality rate (52%), and children and adolescents had the lowest mortality rate (Below 1%). In addition, there were 3 underlying risk factors, namely diabetes with 167 cases (28%), heart disease with 149 cases (25%), and high blood pressure with 103 cases (17%), which had the greatest effect on death (Figure 2). It was obvious that one of the chronic diseases was linked with the mortality rate (65%). The highest number of deaths was recorded in July 2021, with 69 cases (15.7% of all reported deaths), and the lowest number was in February 2020 and November and December 2021,

with just 2 cases (0.4%). Furthermore, there were just 2 cases of death from COVID-19 in 2018, 185 cases in 2020, 250 in 2021, and 250 cases in 2022. Most of the deaths were among homemakers, with 106 cases (24%). Most of the cases (35 patients) died just 1 day after hospitalization.

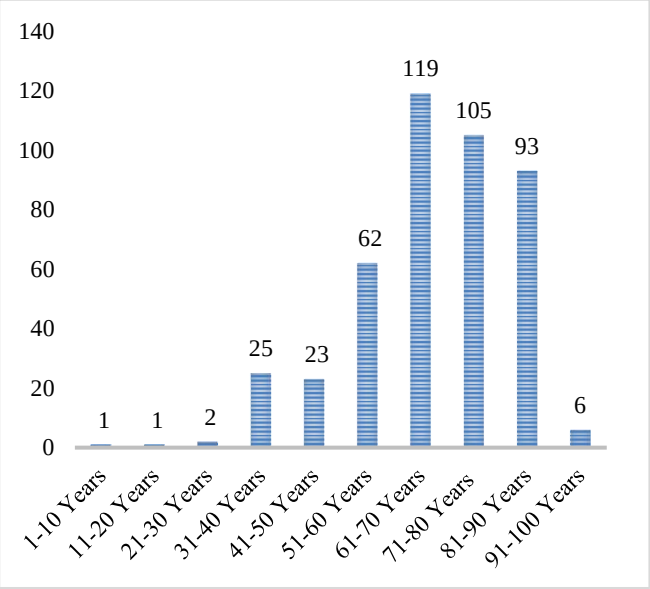

Figure 1. The Frequency of COVID-19 in Behbahan County by age groups in 2020-2022

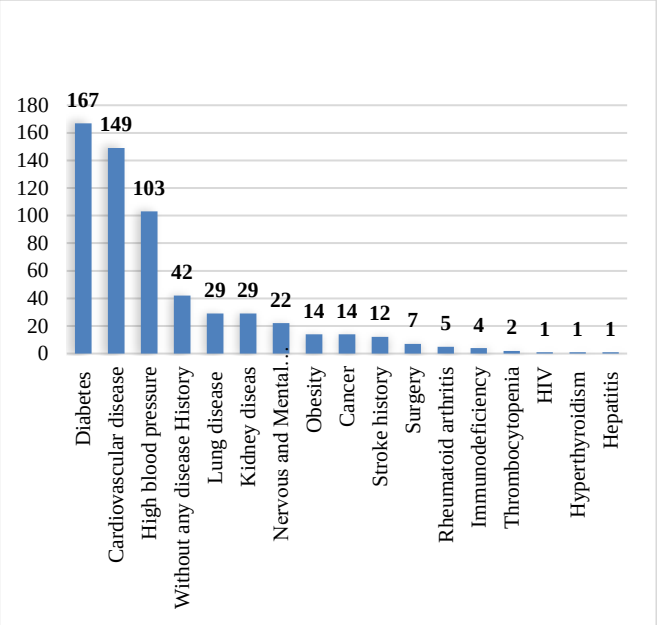

Figure 2. Frequency of deaths caused by COVID-19 in Behbahan County by the cause (Risk factor) of death in 2020-2022

Discussion

Based on the results of the survey in the 2 years from the beginning of the COVID-19 pandemic, i.e., 2020 to 2022, from the total number of patients referred to all the hospitals in Behbahan City, just 1.2% died as a result of COVID-19. The mortality rate varies in different studies. In the study by Sheikhi et al. (2021), about 13% of patients died from COVID-19 (13). In 2020, Mousavi Jazayeri reported that the death rate of COVID-19 was 6% in Bandar-e Abbas (14). Talebi et al. showed in 2020 that in Sabzevar, the mortality rate among hospitalized patients was approximately 15% (15). Gozidehkar et al. reported that the mortality rate was 12.9% among patients admitted to Shahada Shahr Hospital in Qain (16). In the studies of Huang et al., Chen et al., and Wang et al., the mortality rate in hospitalized patients was 15%, 14.1%, and 4.3%, respectively (17-19). This difference in the death rates of patients infected with COVID-19 is likely because of the differences in people's physiological status and immune systems, timely referral of patients, hospital facilities, special medical care, underlying diseases, etc. (20).

The findings of the present research showed that the mortality rate is higher among men than women, which is compatible with most of the published studies, including the studies of Ghazidekar et al., Sheikhi et al., and Chen et al. (13,16,18). However, in Liu et al.'s study in China, the mortality rate is higher in women, contrary to the findings of the present study (21). This can be due to the more exposure and contact of men compared to women because of their occupation and the presence of underlying and chronic diseases in men (22). In the study of Sheikhi et al., Akhvizadegan et al., and Liu et al., the mortality rate in patients with cardiovascular diseases, high blood pressure, or chronic respiratory and kidney diseases was higher than in other people who did not have a history of underlying disease, and these results were aligned with the present study (13,23,24). Note that about 85% of the deceased people in the current study had at least 1 or 2 underlying diseases. On the other hand, viral diseases themselves may be the cause of secondary fungal and bacterial diseases, kidney failure, increases or decreases in the levels of other fluids and hormones in the body, hepatitis, cancer, etc., due to the suppression of the immune system and increased mortality. The effect of this disease is caused during hospitalization or treatment in people.

Conclusion

There was a significant correlation between the age of the patients, the history of at least one chronic disease, and the mortality rate in infected patients. For this reason, it is crucial to implement precautionary procedures to reduce the number of deaths among infected people. Thus, the results of the present study can depict a better picture of the patients' condition in Behbahan and provide insight into future approaches.

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Ethical statement

This study was supported and approved by the Ethics Committee of the Behbahan Faculty of Medical Sciences (Code: IR.BHN.REC.1401.010). Patient data were de-identified to protect their privacy and confidentiality of information. Additionally, the study was conducted with the utmost respect for the cultural norms and traditions of the participants. Any potential conflict of interest was disclosed and managed appropriately. The results of the study will be disseminated in a manner that respects the dignity and privacy of the participants and without identifying any individual participants.

Conflicts of interest

None

Author contributions

The research was designed by AJ and KAB, DN, ZS, AD, AW, and ZN conducted the data collection. The statistical analysis of the data was performed by MS, HB, and MJ. The manuscript was edited by NN.

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