



Study of the Distribution of the Frequency of Heart Diseases Caused by Fine Dust and Pollen in Zabol City

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Abstract

Background: Climate is a variable phenomenon, and its variability has always been of interest to climatologists.

Objectives: Since climate plays an important role in all aspects of life, attention to its changes has become one of humanity's concerns, especially in recent decades, and it can be considered the greatest challenge of the 21st century. Dust is one of the atmospheric phenomena that occur in many regions of the world.

Methods: This study is a cross-sectional study. Data on air pollutants, particulate matter, and dust were collected from the Zabol Meteorological Center, and the resulting information was plotted in appropriate graphs. Descriptive statistics and Pearson's correlation coefficient were used to analyze and determine the relationship between air pollution and resulting heart diseases.

Results: This study is a descriptive cross-sectional study conducted in 1404 AH. Data on air pollutants, particulate matter, and dust were collected from the Zabol Meteorological Center. Additionally, 96 patients referred to Amir al-Momenin Hospital in Zabol were examined in this study. The results showed that the highest prevalence was blood pressure (26.04%), and the lowest prevalence was rheumatoid arthritis (1.04%).

Conclusions: The results indicated that with the increase in fine dust, the number of cardiovascular patients visiting the hospital increased.

Keywords: Dust, Heart Disease, Zabol, Outbreak

1. Background

Climate is a variable phenomenon, and its variability has always been a topic of interest to climatologists. Since climate plays an important role in all aspects of life, attention to its changes has become one of mankind's concerns, especially in recent decades. The frequency of occurrence is much higher in arid and semi-arid regions and has significantly affected living conditions in many countries in the arid and semi-arid regions of Asia (1).

In the study of air pollutants and particles, dust and fine dust occupy an important part. The phenomenon of

fine dust and its invasion from the west of the country and the Arabian Peninsula towards our country has been intensifying for some time and has affected most parts of the country with its destructive effects. It is a fatal phenomenon that has many effects on health. According to the World Health Organization, more than 300 million people die annually due to the harmful effects of outdoor air (2). One million people suffer from lung cancer (3). Various diseases, including mental retardation, respiratory disorders, acute heart attacks, neurological and visual complications, anemia, and increased mortality from heart attacks and strokes, have been identified by researchers as frightening

consequences of urban air pollution (4). Dust storms cause significant reductions in visibility, respiratory symptoms, and eye problems in people, and cause significant damage to animals, plants, industries, and social activities (1).

Globally, one of the natural sources of dust entering the atmosphere is the rise and horizontal movement of air masses containing dust particles and desert dust due to temperature changes. The residence time of these particles in the atmosphere is long and sometimes may range from several days to several weeks. Iran is located in a dry and desert belt, and the most important factor in the drought is the high pressure adjacent to the tropics.

2. Objectives

The aim of this study is to investigate the frequency distribution of heart diseases caused by particulate matter and dust in Zabol city.

3. Methods

This is a descriptive cross-sectional study conducted in 2024-2025. Data on air pollutants, particulate matter, and dust were collected from the Zabol Meteorological Center. In this study, 96 patients who referred to Amir al-Momenin Hospital in Zabol with complaints of respiratory disease were examined.

The results of this section were used to determine the relationship between air pollution and the diseases resulting from it using descriptive statistics and Pearson's correlation coefficient.

4. Results

This is a descriptive cross-sectional study conducted in 1404 AH. Data on air pollutants, particulate matter, and dust were collected from the Zabol Meteorological Center. Additionally, 96 patients referred to Amir al-Momenin Hospital in Zabol were examined in this study. The results showed that the highest prevalence was blood pressure (26.04%), and the lowest prevalence was rheumatoid arthritis (1.04%, Table 1).

5. Discussion

In a case-crossover study conducted by Li et al. in eight major cities in China, a 10 $\mu\text{g}/\text{m}^3$ increase in the 2-

day moving average of PM10, SO₂, and NO₂ concentrations was significantly associated with an increase in daily cardiovascular disease mortality (5). Another study examined 12 years of time series in the United States. The results showed that daily changes in PM10-2.5 were associated with emergency room admissions due to cardiovascular disease among the elderly (over 65 years of age) (6). In a case-crossover study in ten southern European cities, results showed that forest fires and PM10 were associated with increased cardiovascular disease mortality in city dwellers (7). In a time-series study by Zhao et al., 56,940 outpatients in China were examined. Results showed that a 10 $\mu\text{g}/\text{m}^3$ increase in present-day PM10, SO₂, and NO₂ concentrations was associated with a 0.56%, 2.07%, and 2.90% increase in outpatient visits for arrhythmia (8).

A study conducted on 5,973 cases between 2000 and 2010 in Stockholm showed that exposure to moderate levels of O₃ increased the risk of cardiac arrest in patients (9). In a study conducted in a region in northeastern China, the results indicated that air pollution increases cardiovascular disease in overweight and obese individuals (10). Increasing the amount of nanograms per cubic meter caused an increase in coronary events (11). Another study that examined data from 22 European groups found that 0.1% of air pollutants were associated with mortality from heart disease (12). In another study, results showed that short-term exposure to fine particle air pollution was mainly associated with the onset of acute ischemic events (myocardial infarction and stroke) (13).

5.1. Conclusions

The findings of this study indicate that exposure to dust above the permissible limit causes a significant increase in symptoms of heart disease and a significant decrease in heart function parameters. Therefore, to reduce or eliminate the prevalence of these symptoms, plans should be made to reduce the amount of dust in the area.

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Table 1. Frequency Distribution of Underlying Diseases in the Study Group

Variables	Value ^a
Tuberculosis	5 (5.20)
Diabetes	15 (15.62)
COPD	20 (20.83)
Asthma	6 (6.25)
Chronic kidney failure	2 (2.08)
Rheumatoid arthritis	1 (1.04)
Blood pressure	25 (26.04)
Ischemic heart disease	10 (10.41)
Other cases	12 (12.5)

^a Values are expressed as No. (%)

professors who helped collect and write this article.

Footnotes

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