

# Daily lifestyles in the fog and haze weather

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**Background:** China is being plagued by a large-scaled lasting fog and haze, under which people have to work and live. Therefore, it matters to do what we can to minimize the adverse impact of the fog and haze on individual health on a daily basis.

**Methods:** Relative literatures on the fog and haze have been searched and reviewed. Particular attention has been paid to the literatures on the adverse impact of the fog and haze on the people's health and on the ways minimizing this impact.

**Results:** Coming across the weather of fog and haze, appropriate measures taken can minimize its adverse impact on individuals on a daily basis. The measures included vitamin intake, water drinking, air cleaning indoors, stay-at-home, and mask wearing outdoors. These measures are simple and proven effective.

**Conclusions:** Simple and effective measures seem to be sufficient to minimizing the adverse impact of the fog and haze on the individual's health on a daily basis. Lifestyle changes, awareness of environment protection, energy conservation, and new and clean energy use are ultimate ways to curb the air pollution and reduce the occurrence of the fog and haze.

**Keywords:** Lifestyle modifications; air pollution; fog and haze, PM2.5

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Air pollution has been becoming a more and more serious problem with industrial development and urbanization in China. China suffered a large-scaled lasting fog and haze, covering Beijing, Shanghai, Guangzhou and Xi'an, in January 2013 (1). The Eastern China suffered a much longer and wider range of the fog and haze in December than that in January of the same year of 2013 (2). The health risk of particulate matter with an aerodynamic diameter of less than 2.5 micrometers (particulate matter with an aerodynamic diameter of less than 2.5 micrometers, referred to as PM2.5) and other air pollutants (e.g., NOx and ozone) that cause the fog and haze has caught wide public attention.

Among the various air pollutants, PM2.5 are able to penetrate deep into the small airways, alveoli, and finally into the blood stream, where they can lead to subsequent inflammations, vasoconstrictions, even malignancies and premature deaths (2-4).

## Eating in the weather of fog and haze

### *Sufficient vitamin intake*

Vitamin A raises the body's immune functions and improves resistance to infections. Manifestations of vitamin A deficiency are impaired vision and immunity. Vitamin A is found naturally in cod liver oil, liver, dandelion greens, carrot, eggs, milk and fruits (5). Vitamin D is mainly synthesized in adequate amount by the skin exposed to sunlight. Its deficiency can cause rickets, osteoporosis, osteomalacia, tetany disease and viral infections due to lack of sunlight exposure. Vitamin D is found in a few dietary sources, such as cod liver oil, fatty fish species, including catfish, salmon, and mackerel (6). Vitamin C is a highly effective antioxidant, acting to lessen oxidative stress, which exerts a positive impact on cardiovascular disease,

hypertension, chronic inflammatory diseases, diabetes and severe burns. It can be replenished by eating fresh vegetables and fruits (5). Liver and seafood also provide zinc, selenium, copper and other trace elements, maintaining the function of the immune system. Sufficient vitamin intake is helpful to mitigate the adverse effects of the fog and haze.

### *Drinking water*

Drinking avoids dehydration, dry skin and chapped lips. Intact skin prevents air pollutants from invading and damaging body. Pear, loquat, and oranges have capacity to clear lung and eliminate phlegm according to the traditional Chinese medicine.

## **Living in the fog and haze**

### *Keep air clean indoors*

The outdoor air pollution is significantly more serious when the fog and haze occurs. Avoid windows opening before the presence of a high visibility of ambient air. Use vacuum cleaner to clean carpet, sofa and floor. Frying, one of traditional Chinese cooking methods, should be avoided because it is easy to cause lots of smoke, worsening air pollution indoors. Boiling and steaming are right cooking methods at home. Avoid smoking indoors as tobacco will inevitably produce fine particulate matters, causing air pollution (4). Use activated charcoal to continuously absorb toxic and harmful particulate matters to reduce air pollutants indoors (7). Air purifiers can also be used to improve the indoor air relative humidity (8).

### *Stay at home as possible as you can*

Going outside less is the most effective way to avoid the fog and haze exposure. An epidemiological study in Xi'an has showed a 2.29% and 3.08% increased risk for all-cause mortality and for cardiovascular mortality, respectively, with every 103.0  $\mu\text{g}/\text{m}^3$  increase of PM<sub>2.5</sub> after its exposure (9).

### *Wear proper masks outdoors*

Respirators are used to protect users from hazardous dusts, smoke, carbon monoxide and other particles. The National Institute for Occupational Safety and Health (NIOSH) and the Centers for Disease Control and Prevention (CDC) of the United States recommend the use of a NIOSH-certified

N95 or better respirator for protection of healthcare workers who come in direct contact with patients with avian virus of H1N1. N95 masks filter at least 95% of airborne aerosol with a mass median aerodynamic diameter particle of about 0.3  $\mu\text{m}$ . The use of N95 masks has been recommended in the fog and haze weather. But patients with cardiovascular or chronic lung diseases may suffer dyspnea and hypoxia due to a great inspiratory resistance caused by wearing this kind of professional masks (10). Patients with respiratory or cardiovascular diseases are proposed to minimize going out to reduce PM<sub>2.5</sub> exposure in the fog and haze weather (1). If you have to go out, choose public transportation rather than ride a bike; evade traffic jam to avoid inhaling more air pollutants. It might be better not to drive so as to contribute to reduction of exhaust emission.

### *Body cleaning*

Wash the face, gargle and clean the nasal cavity so as to remove the contamination residues on your body after you enter room, which will prevent from the damage to your health by PM<sub>2.5</sub>. It is better to wash your face with warm water so as to wash the fine particles away on your face. Use dampened swabs to clean the nasal cavity or suck water gently by nose and blow it quickly so as to avoid coughing. Fine particles in the fog and haze weather adherent to the cornea may cause conjunctivitis (11).

## **Physical activities in the fog and haze**

Photosynthesis starts in the good lighting conditions. Plants absorb carbon dioxide and release oxygen. Doing some exercise in an oxygen-enriched environment is conducive to health. The fog and haze can increase the air humidity and decrease the oxygen level. The low temperature stimuli in the morning may more easily induce acute onset of chronic respiratory or cardiovascular diseases in the elderly. Therefore, we should avoid the outdoor activities in the fog and haze if possible. The fog and haze can cause low visibility and increase the occurrences of traffic accidents. Thus, it's not advised for people to go out, let alone to do some exercise in the fog and haze weather; aerobic exercise indoors is advised.

Pay attention to the Air Quality Index (Air Quality Index, referred to as AQI) issued by the environmental protection department. The air quality is excellent when the AQI value range is between 0 and 50. Everyone can take part in the outdoor activities and enjoy a breath of fresh air. The air quality is good when the AQI value ranges

from 51 to 100. Most people can take routine outdoor activities except for those allergic to some pollutants. It is mild air pollution when the AQI value range is between 101 and 150. Susceptible people need to reduce physical activities outdoors. It is moderately air pollution when the AQI value range is between 151 and 200. Susceptible population should minimize activities outdoors while the general population should reduce ones as possible as they can. It is severe air pollution when the AQI value range is between 201 and 300. Susceptible population should stop any activities outdoors while the general population should minimize ones. It is extremely serious air pollution when the AQI value is >300. All people should stay indoors except for those occupied in special jobs (12,13).

### Conclusions

Simple and effective measures seem to be sufficient to minimizing the adverse impact of the fog and haze on the individual's health on a daily basis. Thus lifestyle changes, environmental protection, energy conservation, new and clean energy use are needed to curb the air pollution and reduce the occurrence of the fog and haze, which will for sure be beneficial to human health and development.

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### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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