Research and countermeasures of the influence of air pollution on human body

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Abstract. In recent years, with the development of the economy, environmental problems have become more and more serious. Air pollution not only affects the climate and the living environment, but also has an unimaginable impact on the human body. The adverse effects of air pollution are not limited to physiological health damage, but also involve negative effects in many aspects such as cognitive function, mood and behavior; air pollution can cause damage to the nervous system, brain function and cognitive function, and the damage is concentrated in children, Susceptible people such as the elderly and chronically ill patients. Air pollution can reduce subjective well-being, leading to anxiety, depression, and even increased risk of suicide. The physiological mechanisms by which different sources of pollution affect cognitive and mental health are different. In order for human beings to survive for a long time, research and countermeasures against the causes of air pollution are essential. This paper analyzes the causes of a series of effects of air pollution on humans and proposes corresponding countermeasures.

1. Introduction
Nowadays, air pollution, as a by-product of economic development, has always existed in the process of human civilization. On the one hand, since the reform and opening up, with the steady advancement of economic trains, China has encountered great challenges in air control, from local pollution to large-scale pollution, and gradually entered a period of high environmental risks. According to global data released by the World Health Organization, about two-thirds of the provinces and regions in China are currently affected by air pollution, and air pollution has seriously threatened the daily lives of the people. On the other hand, with the rapid development of the economy, China's human health index is declining. In addition to factors such as economic fluctuations, aging and changes in family structure, the impact of air pollution on human health is gradually emerging. In addition, the 19th National Congress has repeatedly mentioned “ecological civilization” and pointed out that ecological civilization construction is a millennium plan for the sustainable development of the Chinese nation. China must continue to implement air pollution prevention and control actions to win the blue sky defense war. In this context, studying the impact of air pollution on human beings has important theoretical and practical significance on how to correctly handle the relationship between current air pollution and human health and economic development, and how to give full play to the advantages of human capital.
2. The adverse effects of air pollution on the human body

2.1. The effect of air pollution on human cognitive function
Long-term exposure to brain damage may cause brain damage, and potential negative effects such as neuroinflammation and neurodegeneration may manifest as cognitive impairment or decline. The neurological mechanisms of air pollution and cognitive impairment have also attracted the attention of scholars. Longitudinal studies such as Calderón-Garcidueñas have found that exposure to severe air pollution can disrupt the brain's developmental trajectory, leading to cognitive impairment in childhood. Tzivian et al. (2015) suggested that air pollution may cause adult cognitive abnormalities through white matter lesions and cerebral vascular abnormalities. Fonken et al. (2011) found that rats in the airless group were more likely to spend more time and have more errors in learning maze tasks than rats in the air-free group. The researchers further found that hippocampal dendritic spine density decreased in the rat brain, while hippocampal morphological changes involved impairment of learning and memory, as well as increased depression-like responses.

Numerous studies have confirmed that high air pollution can damage nervous system, brain function and cognitive function. This is because air pollutants have potential neurotoxicity. Exposure to these pollutants can be used in the central nervous system, peripheral nervous system, etc. Injury, and thus cardiovascular and cerebrovascular diseases. Some industrial chemical materials in the air can also cause neurodevelopmental disorders and brain dysfunction. Exposure to lower levels of industrial chemical materials during early development may lead to brain damage. Haze and traffic pollution particles can also impair the cognitive function of the elderly as susceptible populations. And these effects are all available for research.

2.2. The impact of air pollution on human emotions
Air pollution can cause anxiety, depression, and even increase the risk of suicide. Air pollution can cause a variety of diseases and lead to the deterioration of chronic diseases, such as cardiovascular and cerebrovascular diseases, chronic obstructive pulmonary disease, etc., and epidemiological studies have confirmed that the presence or deterioration of chronic diseases can cause acute or chronic, long-term Psychological effects and increase the risk of suicide. Early studies have found that when air pollution gains weight, people who show symptoms of anxiety will also increase; through the analysis of the number of telephones and air pollution levels for first-aid requests for mental illness within two years, it is found that when air pollution gains weight At the time, the emergency call for mental illness will increase accordingly. The surge in optical oxidants not only exacerbates the suffering of patients with mental illness, but also increases the risk of suicide in these patients. In order to find out that patient suicide has a greater relationship with that source of pollution, experts conducted a three-year follow-up study. The study found that individuals with cardiovascular disease, an increase in particulate PM 10 will increase their suicide risk by 18.9%.

In addition to exploring the impact of different air pollution sources on suicide risk, there are also studies that focus on whether changes in seasons and winds will trigger the impact of air pollution on suicide risk. Studies have found that seasonally excessive periods, such as the spring and autumn, people have more exposure to air pollutants, which may lead to an increase in suicide risk.

2.3. The impact of air pollution on labor supply
Air pollution affects the physical and mental health of residents in all aspects, manifested as mental impairment in brain cognition, thinking acuity, and obvious clinical symptoms. Studies have shown that contaminated particles in the air can enter the brain through the olfactory center, leading to reduced sensitivity, memory loss, fatigue, distraction and judgment disorders, which are mental injuries that are not easily detected directly. Air pollution can cause a decline in human health and has a certain negative effect.

According to the theory of human capital, the healthier people are more likely to actively participate in the labor market; the progress of social security can promote the improvement of the health of workers,
thus ensuring the supply of labor. On the contrary, the decline in the health level of workers or their family members not only increases the labor costs of the workers themselves, but also reduces the labor supply time for the care of sick families.

Therefore, air pollution has a large or small impact on labor supply. Air pollution reduces the working hours of workers. Parents with children are more likely to reduce working hours in serious pollution incidents, and the medium and long-term impact of pollution is greater.

In addition, air pollution will have a certain impact on human intelligence, and long-term exposure to air pollution will reduce intelligence. The study found that air pollution has a cumulative effect, and its destructiveness will increase as people age, especially in mathematics and verbal ability. Among them, older men with lower education levels are the most affected. One of the reasons is that most of this group often engages in outdoor physical labor, so it is inevitable to be exposed to air pollution for a long time.

Therefore, it is extremely urgent to manage and solve the problem of air pollution. It is necessary to find the cause and give corresponding countermeasure analysis.

3. The analysis of the causes of air pollution on the human body

3.1. Analysis of the causes of human cognition and emotion

A small amount of industrial chemical raw materials in the air, such as lead, methylmercury, polychlorinated biphenyls, arsenic and toluene, which cause a series of cognitive dysfunctions in humans; traffic-related air pollutants such as carbon monoxide and carbon dioxide Nitrogen oxides, hydrocarbons, ozone, black carbon, etc. also have a negative impact on children's cognitive function. Moreover, the air pollutants in the real environment are not a single component, usually a complex mixture composed of multiple sources of pollution. Many pollutants are seriously exceeded, and the weight gain for cognitive defects is more obvious.

The correlation between air pollution and depression and suicide may be due to substances that contain toxic nerves in particulate matter components (such as lead, mercury, manganese, etc.), which directly damage neurobehavioral functions, and the pathogenesis of depression It involves the mechanism of neuroinflammation. Particulate matter in air pollution is a strong inflammatory agent, which may cause inflammation and tissue damage in the prefrontal cortex. Neuroinflammation destroys the blood-brain barrier and is a key factor in the development of central nervous system diseases. Neuroinflammation can also cause Cerebral vascular endothelial injury leads to further development of vascular depression, thereby increasing the risk of suicide.

Studies have also shown that air pollution causes anxiety and depression, and is also associated with impaired subjective well-being. Subjective well-being is an important protective factor for negative emotions, but concerns about the threat of air pollution

Fear will reduce the subjective well-being of the individual.

3.2. Analysis of the causes of the impact of air pollution on labor supply

Air pollution has gradually become an important factor affecting the supply of labor. Particulate pollutants, represented by sulphur dioxide, do have a negative impact on labor supply. Air pollution can affect labor supply by affecting health levels. That is to say, air pollution causes loss to healthy human capital, hinders the accumulation of healthy human capital, and increases the probability that labor will withdraw from the job market, thereby further reducing the level of labor supply. The development of education and health care, as well as the extent of education, are also key factors influencing the supply of labor.
4. The social causes of air pollution
The rise of human living standards, such as the increase of domestic garbage, the popularity of automobiles has increased the degree of air pollution; urbanization and industrialization have also aggravated air pollution. The factory will emit a large amount of toxic gases, doped in the air, and make air quality. Decline, which in turn affects the human body.

At present, China is in a critical period of economic transformation and structural adjustment. The simple pursuit of high-growth development model cannot guarantee long-term sustainable development, environmental problems such as air pollution are intensified, and the resulting decline in human health and labor supply is relatively Insufficiency will gradually become an invisible bottleneck restricting China's steady development.

Air pollution creates pressure on the region. The worse the air quality, the more the region will reduce investment in fixed assets and increase investment in environmental pollution control. Changes in the work of local stakeholders will also be affected by the dual pressures of economic and sustainable development.

5. The countermeasures of air pollution

5.1. In-depth study of air pollution and cognitive and emotional impacts
It will form a multidisciplinary research team in the fields of medicine, psychology, sociology, and public administration to further explore the pathogenesis and influencing factors of air pollution, damage to the nervous system, brain function, cognitive function and other psychological functions. Compare and analyze the differences and similarities between individual and group responses to air pollution problems and responses to natural disasters and technological disasters, and analyze their root causes to better draw on the relevant research results of disaster psychology and environmental psychology. Develop effective psychological interventions to explore in-depth issues of air pollution in the psychological health effects of different social groups. In addition, China's particulate matter concentration has far exceeded the particulate matter standard value specified in the World Health Organization's Air Quality Guidelines, that is, PM2.5 is seriously exceeded, and outdoor air pollution causes about 300,000 premature deaths in China each year. At present, many families in rural China still use coal, firewood and straw for cooking and heating. Incomplete combustion of these materials will produce black carbon, and black carbon is also a kind of traffic pollution particles. Future research may consider selecting rural areas in China. Especially for families close to the expressway, assessing the damage of black carbon on cognitive function and nervous system, the research results will help to better formulate air pollution control measures.

5.2. Measures to be taken by the government in the face of air pollution
Promote the development of environmental technology, introduce punishment and incentive mechanism, the government should take a two-pronged approach, from the "source" and "end" to air pollution problems, can refer to international experience, strengthen intervention in the field of air pollution control, increase emissions of air pollution sources The punishment is to gradually promote the development of environmental technology and introduce incentives to achieve a "win-win" pattern of economic growth and environmental governance.

The development of education and medical care can reduce the damage of air pollution to the human body. Therefore, the government should appropriately increase the investment in healthy human capital and education human capital in areas with serious air pollution. On the one hand, we will continue to improve the level of medical and health services and improve medical and health conditions. On the other hand, we will continue to develop education, increase investment in education, expand the high-quality workforce, and enhance human ability to cope with air pollution risks.

Strengthen corporate responsibility awareness. Nowadays, the competition among enterprises has gradually changed from traditional cost and market competition to talent competition. Therefore, the protection of workers not only helps the company's own stability and development, but also helps
enterprises to establish a good corporate image and more comprehensively reflect. Its sense of social responsibility. Specifically, companies can reduce air pollution to workers by reducing the exposure of workers to low-quality air, providing reasonable health benefits, and strengthening protection measures and human care for outdoor workers in inclement weather. Health hazards.

Research findings that reducing fixed-asset investment can improve air quality and increase environmental pollution control investment cannot improve air quality. It shows that China’s past economic growth is more of an extensive economic growth driven by investment. Under the extensive growth model, Development and the environment are contradictory. The environmental improvement brought about by reducing investment in fixed assets can only be short-term and unsustainable. Therefore, in order to truly achieve sustainable development, in addition to incorporating environmental performance into the assessment of governance mechanisms, it is more important to guide local transformation of economic growth patterns, abandon extensive growth patterns, encourage green technology innovation, and promote regional industrial restructuring and industry. Technology upgrades, especially the transformation and upgrading of production methods in the secondary industry, can truly realize ecological civilization and ultimately achieve harmonious integration of development and environment.

6. Conclusion
There are many types of air pollutants and a wide range of sources, that is, both outdoor and indoor. The impact on human health has both short-term and long-term effects. At present, various control technologies have advantages and disadvantages. In the control technology, it is necessary to optimize the combination of new technologies and integrate various technical advantages into one to control indoor pollution. The control of air pollution should comprehensively consider scientific design from many aspects to improve air quality and create a healthy and comfortable living environment.

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