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## Analysis on the Characteristics of Pneumoconiosis in Coal Mines in China and Its Control Countermeasures

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**Abstract** China reported a total of 159,032 cases of occupational diseases, including 138,939 cases of pneumoconiosis, accounting for 87.37%, during the six years of 2009-2014, the current pneumoconiosis is still the most serious occupational disease in China, coal mine pneumoconiosis is called "invisible killer." Coal mine pneumoconiosis not only endanger the health and life safety of miners, caused a huge economic burden to the coal mine, but also related to the social harmony and stability brought great international pressure. This paper based on the brief description of the characteristics of coal mine pneumoconiosis in China, and puts forward the relevant countermeasures according to the actual situation of China's coal mine pneumoconiosis prevention and treatment.

**Keywords** Coal mine, Pneumoconiosis, Characteristic analysis, Prevention and cure

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### 1. Introduction

According to statistics, as of the end of 2013 China reported a total of 83,000 cases of occupational diseases, of which 750,000 cases of pneumoconiosis, accounting for 90% of the total number of cases. Pneumoconiosis occurred in coal mining enterprises, accounting for more than 60% of the total number of pneumoconiosis [1]. Behind these a bunch of heavy numbers, it was a brother of a miner who had difficulty breathing. Pneumoconiosis to the country each year caused direct economic losses of more than 100 billion yuan, indirect economic losses of more than 400 billion yuan [2]. Because of the severity and suddenness of the accidents caused by different pneumoconiosis and other disasters in the mine, the social impact is not so severe, so it is often not taken seriously by the people. In fact, the miners caused by pneumoconiosis are disabling and The number of deaths in China is far higher than the sum of all types of industrial accidents. Can be said to be "white injury" and more "red injury" [3]. Pneumoconiosis due to its own long incubation period, the incidence of slow, often a variety of different complications, it is difficult to determine the initial onset of its disease. The coal miners during the work of the lack of professional occupational disease inspection and diagnosis of its incidence and disease is not clear, the workers often after retirement gradually show the characteristics of the disease, pneumoconiosis patients is difficult to get timely treatment. So far, no any drug can be accumulated in the lungs of the dust all cleared, which exacerbated the harm of Chinese coal mine pneumoconiosis [4,5]. Therefore, it is important to find the characteristics of China's coal mine pneumoconiosis, and find a solution to the problem from the root.



## **2. The Characteristics of Pneumoconiosis in Coal Mines in China**

### **2.1. Contact dust personnel base large and high prevalence**

At present, China has more than 5 million coal mine contact dust workers, each year one after another new pneumoconiosis patients 1 million -1.5 million people, due to the low rate of physical examination in some coal mines, and pneumoconiosis has a delayed and hidden characteristics, the data also will be even more amazing. Poor working environment, dust concentration over standard seriously caused by China's coal mining enterprises have become an important cause of high incidence of pneumoconiosis, coal face, for example, coal face dust production accounted for more than 60% of total dust production, China's "coal mine safety regulations" on the human body the greatest harm, suffering from pneumoconiosis culprit breathing dust has strict requirements: dust free silica SiO<sub>2</sub> content <10%, the maximum allowable concentration of respirable dust 3.5 mg/m<sup>3</sup>. On the investigation of statistics and on-site inspection, part of the coal mine dust concentration exceeded ten times or even several times, and some even more than a few hundred times the national standard [4,6].

### **2.2. Coal mine is not enough attention, dust control measures difficult to implement**

Pneumoconiosis is a chronic disease, from miners to contact dust, until death, generally to last 3-15 years, or even longer. At the same time, the resulting death cases are basically scattered distribution, direct harm to the accident caused by the loss of strong, and thus difficult to cause the widespread attention of enterprises and society [7]. China's coal mine geological conditions are complex, poor mining conditions, it is difficult to large-scale mechanized mining, low mechanical rate, per unit output is low, which cause a certain impact on pneumoconiosis. Although, prevention of pneumoconiosis mine comprehensive dust and personal protection measures are many, the number of pneumoconiosis is still more, the reason is that the defense did not play its proper role [8]. Like coal drill wet drilling often because of electric water leakage and affect the normal work, greatly reducing the efficiency of the workers were abandoned; dust masks due to poor ventilation, resulting in the work of the workers in the breathing difficulties were workers removed.

### **2.3. The victims are mainly peasant workers**

According to the latest statistics from the Chinese Ministry of Health, more than 90% of occupational diseases in China are peasant workers. As the main working group of coal production, the knowledge level of peasant workers is low, the self-protection ability is poor, the awareness of security protection needs to be improved, and it is more likely to suffer occupational hazards in the actual production. And peasant workers in the group of labor protection training, health care treatment, industrial injury insurance and many other aspects, it is difficult to obtain the same standards and other enterprises. Peasant workers are often manifested as pneumoconiosis incidence of short-term, high incidence [9]. Permanent Worker in large enterprises usually have a strong concept of professional protection, in contrast to the backward process of small and medium enterprises in the peasant workers they often ignore this self-protection concept. It is that the peasant workers group relatively weak sense of rights and legal awareness, resulting in sick after the identification of occupational diseases and the road of safeguarding rights is very difficult. Active patients are very few, most patients are chosen to silence and wait for death [10].

### **2.4. Check the diagnosis of identification difficult, safeguarding rights time is long**

Pneumoconiosis latency is longer, the incidence is relatively slow, it is difficult to determine the incidence of timely, and apply for occupational disease diagnosis required more materials. Including: labor contracts, occupational health care archives, career history, past medical history, where the workplace over the years of occupational hazards test results etc [11]. For pneumoconiosis patients, the most difficult thing is to obtain from the employer's occupational disease history of the material, which is tantamount to let the enterprise claiming to be guilty, so most companies in order to escape the responsibility usually they refused to provide proof of occupation history, more coal carrying a conscience to deny the existence of labor relations with miners. Under normal circumstances, according to the "Industrial Injury Insurance Ordinance" and the relevant Chinese laws and regulations, there are a dozen procedures to deal with industrial injury, complete all normal legal procedures



in the actual operation of at least 1,200 days or so. Coal mining enterprises in patients with pneumoconiosis difficult to confirm and statistics, the diagnosis of patients is also difficult to get timely treatment, but also exacerbated the hazards of coal mine pneumoconiosis.

### **2.5. There are large loopholes in regulation**

Most coal mining enterprises will be placed the dust control under the safe and ventilated departments to help manage, the coal mine safety and ventilation departments are often overlooked respirable dust hazards, and only concerned about the dust explosion. Some enterprises of occupational disease prevention and control institutions anchored in the labor sector, medical institutions, principal are part of these departments, some companies are not no clear set occupational disease prevention and control institutions [12]. Most of the coal mine lack of occupational disease special monitoring departments and management agencies, miners can not timely access to accurate information from the coal mining enterprises occupational disease information, and timely transfer from the original position, thus missed the prevention and treatment of occupational diseases the best time. At the same time, occupational health supervision and control of coal mine dust prevention and control work is not in place, it is difficult to form a pressure on the enterprise should be prevention and control, health departments and coal mine safety supervision departments there is a certain function of cross, the division of labor in the division of labor is inevitable there will be neutral, it is difficult to really achieve the same responsibility and effective operation.

## **3. China coal mine pneumoconiosis prevention and treatment measures**

### **3.1. Introduction of the promotion of advanced technical measures to improve the labor production environment**

There are many differences between China and the United States in terms of industry standards, such as the criteria for determining the concentration of dust. There are not only differences in the limits, the way of expression, and the way dust is measured [13]. First of all, we should be combined with China's practical experience in foreign advanced, to promotion of coal seam water, irrigation pre-wet coal body in goaf, wet drilling, water blasting and blister mud, improve the shearer cutting mechanism and working parameters in the dust. Such as use technology of real-time tracking dust collection in the coal face, the power required for the underground is to turn into water and wind, implementation of coal cutting and dust suppression chain mechanism, put dust monitoring together with the coal mine real-time monitoring system as the same of gas monitoring, through the coal mine dust real-time monitoring and surveillance, not only can reflect the miners operating dust distribution, dust concentration, but also predict the miners in the operation by the degree of dust hazards and contact dust workers accumulated dust in the lungs. In the prevention and control system secondary dust improvement, the measures we can take include: infrared automatic spray dust, sprinkler and automatic cleaning truck dust, automatic mine car washing dust [14]. In addition, we can use of the air curtains and individual protective equipment to isolate miners and dust away, especially the respirable dust [15-17].

### **3.2. Coal mine set up a special occupational disease prevention and control institutions**

Coal mines in the security of the investment accounted for a large number of coal production costs, resulting in coal mine occupational insurance prevention and control funding seriously inadequate. But the coal mine should adhere to the people-oriented to establishment of a dedicated and independent dust management agencies. As the agencies of ventilation, safety supervision, the geological sector, equipped with full-time dust and occupational disease prevention and control of technical personnel, independent of mine dust and occupational disease prevention and control work, which main work of this department include: the implementation of the relevant dust regulations, make mine dust control technology measures, development of dust control work management system, mine dust inspection and supervision, dust safety training, hold a regular meeting on dust-proof work, check the elimination of backward dust-proof equipment, supervision of workers on the use of labor insurance products, basis for miners for occupational disease inspection and diagnosis on a regular. The coal mine management department should also establish the environmental access mechanism of the coal mine, urging coal mines to set up specialized occupational management departments and unified management,



establish and improve the occupational disease information file of the coal mine worker, and regard the respirable dust concentration index as the dangerous index system with the same status as the gas.

### **3.3. Strengthen coordination between departments and establishment of occupational health care system**

The establishment of multi-sector integration of occupational disease supervision and coordination mechanism to change the current long management is actually no one responsible for the situation. After the reform of government institutions in 1998, China's occupational safety and occupational health work became divided. In recent years, China gradually establishes and improve the occupational health supervision system at the same time, also created a occupational safety and occupational health management foundation. Occupational safety and occupational health belong to the scope of labor protection, with the same nature of the two work in essence. International integration is usually implemented [18,19]. But also to establishment of occupational disease care and rehabilitation system, and vigorously promote the coal mine occupational health information construction. Although the current pneumoconiosis is still no way to be cured, through a certain means of rehabilitation and the corresponding nursing intervention can still improve the patient's body resistance and to prevent the patient's condition deteriorated. Regularly carry out occupational health examination and archiving, the physical examination results in a timely manner to the workers, so that patients with pneumoconiosis in a timely manner to be effective treatment. And post-rehabilitation care should also establish an effective reimbursement and feedback mechanism.

### **3.4. Improve the laws and regulations and increase the intensity of occupational injuries**

Relevant departments should continue to strengthen the work of occupational hazards prevention and control work to protect the health and safety of workers, combined with China's technology and management practices, develop a series of laws and regulations and technical standards. Depth coal mine line, and earnestly listen to the voice of workers. And constantly improve and revise the "Occupational Disease Prevention Law", "Occupational Disease Diagnosis and Identification Management Approach" and other laws and regulations. Clearly stipulates that the employer to provide occupational protection, health inspection and supervision, occupational disease treatment and compensation and other aspects of legal responsibility. The government to develop relevant policies to encourage coal mines to increase the attention of dust prevention and control work and investment efforts. Coal mine is the main responsibility for dust control, the key of dust control is coal mine, only the enthusiasm of the coal mine enterprises fully mobilized, the majority of coal mining enterprises are willing to put more cost and energy to prevent dust, coal dust control work grim The situation can be fundamentally reversed. The national safety supervision department shall formulate the regulations on the work of dust pollution prevention work of coal mines with certain legal effect, and the enterprises and responsible persons who do not take dust protection and dust seriously endanger the safety of the workers or can not be treated in time for the victims should, who giving a variety of administrative and economic penalties should be regarded as serious. So that the dust business work by the supervision, and the formation of a certain pressure [20].

### **3.5. Establishment of Pneumoconiosis Relief and Prevention Fund and to simplify the identification of claim procedures**

To establish a sound electronic information files, and have a regular pneumoconiosis examination, the staff of the health status of long-term follow-up observation for the dust miners. Establishment of Pneumoconiosis Relief and Prevention Fund, as the coal mine safety production liability margin system, from the per ton of coal attached to a certain percentage of the deposit for workers suffering from pneumoconiosis treatment and liability issues to provide protection, which also can be used for the new dust technology investment and research and promote the development of technology. Pneumoconiosis Relief and Prevention Fund should strictly implement the earmarked system, the current is still unable to identify the liability and can not receive timely treatment of patients with relief to provide the cost of treatment and basic living security. Due to pneumoconiosis may exist for many years of incubation period, many miners are the incidence after returning home, and cross-regional pneumoconiosis investigation claim are often subject to regional protection, and thus heavy resistance to the

poor miners due to perennial running claims and more poverty. Therefore, the occupational disease diagnosis program and the work injury identification procedure should be further simplified, and the labor department and the occupational disease diagnosis institution can take a one-time identification of the patient's application so that the patient can obtain treatment and compensation more quickly.

#### 4. Conclusion

Occupational safety and health work is an important task related to the safety and health of millions of laborers. It is a symbolic work to realize the sound improvement of China's safe production situation. The future period of time China's coal mine pneumoconiosis may continue to a high incidence, both occupational health work to reflect the historical debts, but also occupational health work in-depth performance, but also the production of small and medium-sized coal mines have been abandoned by history. And earnestly implement the "safety first, prevention first, comprehensive management" of the safe production approach, fully mobilize and play the power of society, strengthen the research efforts, and actively seek treatment of drugs and methods to reduce the suffering of pneumoconiosis patients, to extend its life.

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