

ANALYSIS OF THE STATUS OF NEWLY REPORTED OCCUPATIONAL DISEASES IN EMPLOYING UNITS IN A CERTAIN CITY FROM 2015 TO 2024

Wei Gao^{1*}, Yong Zhang², Xin Ge¹

¹HuaiBei Occupational Disease Prevention and Control Institute, Huaibei 235000, Anhui, China.

²HuaiBei Center for Disease Control and Prevention, Huaibei 235000, Anhui, China.

*Corresponding Author: Wei Gao

Abstract: Objective: To analyze the epidemiological characteristics and trends of newly reported occupational diseases among employing units in a certain City from 2015 to 2024, and to provide a scientific basis for developing targeted occupational disease prevention and control strategies. Methods: A retrospective epidemiological investigation was conducted. Data from 469 newly reported occupational disease cases in a certain City between 2015 and 2024 were collected from the occupational disease reporting system. Descriptive epidemiological methods and statistical analyses (chi-square test, analysis of variance) were employed to analyze the distribution characteristics and trends of occupational diseases. Results: Pneumoconiosis was the predominant occupational disease in a certain City, accounting for 95.10% of all cases. Among these, coal workers' pneumoconiosis (316 cases, 67.38%) and silicosis (130 cases, 27.72%) were the most common. The year 2019 marked the peak incidence (89 cases), with a fluctuating downward trend observed in recent years. A significant difference was found in the average length of exposure before onset among different occupational diseases ($F = 11.41$, $P = 0.001$), with coal workers' pneumoconiosis having the longest average exposure period (25.66 ± 6.63 years). Conclusions: While certain achievements have been made in occupational disease prevention and control in a certain City, pneumoconiosis remains the primary concern. Targeted prevention and control measures should be strengthened in high-risk areas and industries, and for specific exposure length groups. Additionally, emerging occupational health risks require ongoing attention.

Keyword: Energy city; Occupational diseases; Incidence trend

1 INTRODUCTION

Occupational diseases refer to diseases caused by exposure to dust, radioactive substances, and other toxic or harmful factors in occupational activities among workers of employers such as enterprises, public institutions, and individual economic organizations [1]. Occupational diseases not only severely harm the health and life safety of workers but also impose a heavy economic burden on families and society, affecting social harmony and stability. In 2023, a total of 10,307 new cases of various occupational diseases were reported in China, including 8,186 cases of pneumoconiosis, accounting for 79.41% of the total new occupational disease cases reported[2, 3].

As an important resource-based city in Anhui Province, a certain city has long taken industries such as coal, electric power, and chemical engineering as its economic pillars[4]. While these industries have promoted the economic development of the city, they have also brought relatively serious occupational disease hazards, and the city bears a heavy burden of occupational diseases[5]. To understand the epidemiological characteristics and changing trends of new occupational diseases among employers in the city from 2015 to 2024, this article systematically sorted out and analyzed the reported data on new occupational diseases among employers in the city over the past decade (2015—2024). The report is as follows:

2 RESEARCH OBJECTS AND METHODS

2.1 Research Objects

All new occupational disease report card information from employers under the jurisdiction of a certain city from 2015 to 2024 was collected as the research objects of this survey.

2.2 Survey Contents

Mainly collect information such as the types of occupational diseases of new occupational disease cases, gender, basic information about employers (location, name, category, enterprise scale, economic type), the age of occupational disease patients at the time of diagnosis, length of exposure to hazards, and year of diagnosis.

2.3 Methods

Occupational diseases were classified according to the national Classification and Catalog of Occupational Diseases

(covering 10 categories and 132 types of occupational diseases). The basic situation, trend changes, industry distribution, length of exposure to hazards, age distribution of onset, and other characteristics and trend changes of new occupational diseases in employers in the city over the past 10 years were statistically analyzed.

2.4 Statistical Analysis

Data were input, organized, and processed using EXCEL, and statistically analyzed using SPSS 24.0 software. For data that passed the normality test and conformed to a normal distribution, they were described using mean and standard deviation. One-way ANOVA was used for comparison between groups; chi-square test was used for comparison of rates between groups; the test level $\alpha=0.05$ (two-sided).

3 RESULTS

3.1 General Situation of New Occupational Diseases

In 2024, the number of workers exposed to different occupational hazard factors in a certain city was as follows: 12,640 for coal dust, 9,768 for silica dust, 382 for cement dust, 1,276 for welding fumes, 168 for benzene, 1,295 for lead, and 12,251 for noise.

The distribution and characteristics of different occupational disease cases in a certain City over the past decade are presented in Table 1.

Over the past decade, employers in the city reported a total of 469 occupational disease cases, including 526 males (99.6%) and 2 females (0.4%). Occupational diseases were mainly dominated by pneumoconiosis. Among them, coal worker's pneumoconiosis had the largest number of cases, with 316 cases accounting for 67.38% of the total. The average age of patients was (51.87 ± 8.45) years, and the average length of exposure to hazards was (25.20 ± 6.64) years. Silicosis ranked second, with 130 cases accounting for 27.72%. The average age of patients was (51.32 ± 10.17) years, and the average length of exposure to hazards was (21.95 ± 8.73) years. Other occupational diseases such as noise-induced deafness (9 cases, 1.92%) and welder's pneumoconiosis (5 cases, 1.07%) had relatively fewer cases. In addition, it also included heat stroke (3 cases) and 6 other sporadic cases (1 case each of other pneumoconioses, dimethylformamide poisoning, cement pneumoconiosis, contact dermatitis, brucellosis, and bursitis (limited to underground workers)). The length of exposure to hazards for the patient with dimethylformamide poisoning was 0 years, suggesting acute chemical poisoning (Table 1).

Table 1 Distribution and Characteristics of Different Occupational Disease Cases

Name of Occupational Disease	Number of Cases n (%)	Age at Onset (years)			Length of Exposure to Hazards (years)		
		Mean $\pm$ Standard Deviation	Minimum	Maximum	Mean $\pm$ Standard Deviation	Minimum	Maximum
Coal Worker's Pneumoconiosis	316 (67.38)	51.87 $\pm$ 8.45	34	81	25.20 $\pm$ 6.64	8	40
Silicosis	130 (27.72)	51.32 $\pm$ 10.17	36	82	21.95 $\pm$ 8.73	4	37
Noise-induced Deafness	9 (1.92)	53.67 $\pm$ 1.50	51	56	18.22 $\pm$ 9.05	8	36
Welder's Pneumoconiosis	5 (1.70)	47.20 $\pm$ 4.44	43	52	13.60 $\pm$ 10.26	5	31
Heat Stroke	3 (0.64)	52.00 $\pm$ 13.75	40	67	15.67 $\pm$ 14.01	0	27
Other Pneumoconioses	1	49.70			30.08		
Cement Pneumoconiosis	1	73.43			26.92		
Dimethylformamide Poisoning	1	50.25			0.00		
Brucellosis	1	29.58			1.17		
Contact Dermatitis	1	53.54			1.17		
Bursitis (limited to underground workers)	1	55.08			28.50		

3.2 Trends in New Occupational Disease Incidence

This study systematically analyzed the incidence trends of occupational diseases in the city from 2015 to 2024. Data

showed that pneumoconioses (including coal worker's pneumoconiosis, silicosis, and other pneumoconioses) were the main type of occupational diseases. The distribution of newly reported occupational diseases across different years is summarized in Table 2. Among them, coal worker's pneumoconiosis peaked in 2019 with 64 cases, accounting for 71.9% of the total occupational diseases that year. Notably, the total number of occupational disease cases reached 89 in 2019, the highest in the decade, mainly due to a significant increase in coal worker's pneumoconiosis and silicosis cases (Table 2).

In the long term, coal worker's pneumoconiosis showed a fluctuating downward trend, decreasing from 46 cases in 2015 to 12 cases in 2024, but with a temporary rebound in 2023 (26 cases). Silicosis cases declined after peaking at 24 cases in 2019, with 5 cases reported in 2024. Only 1 case of other pneumoconioses was reported in 2021.

In recent years, new occupational diseases have shown a diversification trend: noise-induced deafness has occurred continuously since 2021 (2 cases in 2021, 2 in 2022, 2 in 2023, and 3 in 2024), indicating that the risk of noise exposure deserves attention. Heat stroke occurred in 3 cases from 2021 to 2022, 1 case of dimethylformamide poisoning was reported in 2022, and brucellosis and contact dermatitis were first reported in 2024 (1 case each). In addition, 1 case of bursitis (limited to underground workers) was reported in 2023.

Figure 1 presents the trend in occupational disease incidence in a certain city over the past decade. The total number of new occupational disease cases fluctuated downward from 63 in 2015 to 22 in 2024, but rebounded to 32 cases in 2023. 2017 and 2020 were the lowest (38 cases) and second lowest (54 cases) points in the decade, respectively. It is worth noting that from 2021 to 2024, although the dominant position of pneumoconioses weakened, the types of occupational diseases increased significantly—from 4 types in 2021 to 5 types in 2024.

Table 2 Incidence of New Occupational Diseases in Different Years

Name of Occupational Disease	Incidence Year (Number of Cases)										Total	Proportion (%)
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024		
Coal Worker's Pneumoconiosis	46	39	25	29	64	41	19	19	26	12	320	68.2
Silicosis	17	18	12	20	24	13	16	2	3	5	134	28.6
Noise-induced Deafness	0	0	0	0	0	0	0	2	2	3	7	1.5
Welder's Pneumoconiosis	0	1	0	1	1	0	2	0	0	0	5	1.1
Heat Stroke	0	0	0	0	0	0	0	2	1	0	3	0.6
Other Occupational Diseases*	0	0	1	0	0	0	0	1	1	2	5	1.1
Total	63	58	38	50	89	54	42	21	32	22	469	100.0

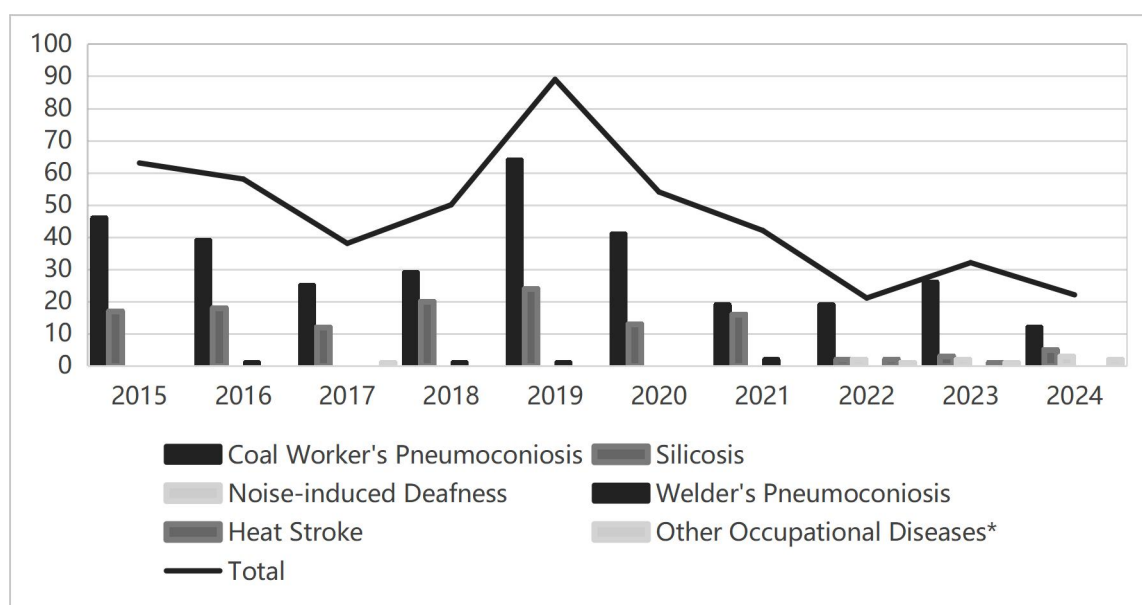


Figure 1 Incidence Trend of Occupational Diseases in a Certain City Over the Past Decade

3.3 Age and Length of Exposure to Hazards at Onset of Key Occupational Diseases

Table 3 presents the characteristics of exposure time and age at onset across different key new occupational diseases. Significant differences were found in the lengths of exposure to hazards at onset among different key

occupational diseases in the city ($F=11.41$, $P=0.001<0.05$). Among them, coal worker's pneumoconiosis had the longest average length of exposure to hazards at onset (25.66 ± 6.63 years), followed by silicosis (22.41 ± 8.70 years), noise-induced deafness (18.55 ± 8.91 years), and welder's pneumoconiosis (14.08 ± 9.99 years). The length of exposure to hazards at onset ranged from 4.08 to 40.92 years. Welder's pneumoconiosis had the shortest average length (14.08 ± 9.99 years); however, due to the small number of cases and a large standard deviation, significant individual differences were observed. The average diagnostic age for all occupational diseases was 52.15 ± 8.85 years. No statistically significant difference was found in diagnostic age among different types of occupational diseases ($F=0.689$, $P=0.559$) (Table 3)

Table 3 Statistics on Length of Exposure to Hazards and Age at Onset of Different Key New Occupational Diseases

Type of Occupational Disease	Number of Cases	Length of Exposure to Hazards (years/Mean $\pm$ SD)	Minimum	Maximum	Diagnostic Age (years/Mean $\pm$ SD)	Minimum	Maximum
Coal Worker's Pneumoconiosis	316	25.66 ± 6.63	8.75	40.92	52.32 ± 8.43	34.95	81.85
Silicosis	130	22.41 ± 8.70	4.08	37.00	51.77 ± 10.15	36.36	82.69
Welder's Pneumoconiosis	5	14.08 ± 9.99	5.92	31.17	47.66 ± 4.39	43.21	52.68
Noise-induced Deafness	9	18.55 ± 8.91	8.33	36.25	54.10 ± 1.43	51.26	56.28
F		11.41			0.689		
P		$0.002<0.001$			$0.559>0.05$		
Total	460	24.48 ± 7.60	4.08	40.92	52.15 ± 8.85	34.95	82.69

4 DISCUSSION

The results of this study showed that pneumoconioses were the dominant occupational diseases in the city, accounting for 95.10% of the total cases. This is highly consistent with the industrial structure of the region—where the coal industry serves as the economic pillar—and aligns with relevant reports on Anhui Province as a whole. As an important resource-based city in Anhui, the city has long relied on industries such as coal, electric power, and chemical engineering. The production processes of these industries involve significant dust hazards, which explains why pneumoconioses have become the most prevalent type of occupational disease.

An analysis of the incidence trend from 2015 to 2024 revealed that 2019 was the peak year for occupational diseases (89 cases), followed by a fluctuating downward trend, with the number dropping to 22 cases in 2024. This trend is generally consistent with national reports[3]. Multiple factors may have contributed to this pattern: First, the 2019 peak may be linked to the active production activities in the coal industry at that time, as well as changes in diagnostic criteria and requirements. With industrial structure adjustment and tighter environmental policies, coal production capacity has been controlled—an important reason for the decline in incidence after 2020. Second, strengthened occupational disease prevention and control efforts (e.g., controlling workplace dust concentrations, improving workers' protection awareness, and popularizing occupational health examinations) have also played a positive role. An increasing number of enterprises now prioritize post protection and employee health record management, which has driven the overall downward trend in incidence.

Notably, although the number of pneumoconiosis cases has generally decreased, the types of occupational diseases have diversified—with non-traditional conditions such as noise-induced deafness, heat stroke, and dimethylformamide poisoning beginning to emerge. This change reflects the effect of the city's industrial structure adjustment and suggests that occupational disease prevention and control must keep pace with the times, focusing on emerging occupational hazards[6].

An analysis of the length of exposure to hazards at onset of key occupational diseases showed significant differences among different disease types ($F=11.41$, $P=0.001$). Coal worker's pneumoconiosis had the longest average length of exposure at onset (25.66 ± 6.63 years), followed by silicosis (22.41 ± 8.70 years), while welder's pneumoconiosis had a relatively shorter length (14.08 ± 9.99 years)—consistent with relevant reports[7]. This difference reflects the distinct pathogenesis and latency characteristics of different occupational diseases. As a chronic cumulative disease, pneumoconioses require long-term exposure to develop; the 21–30-year exposure segment was the peak period for onset (225 cases, 48.91%), which aligns with the long latency of pneumoconioses and matches findings from related surveys[8]. From a preventive perspective, this analysis of exposure length provides a basis for identifying key monitoring populations: Workers with more than 10 years of exposure—especially those with 21–30 years of exposure—should be the focus of occupational health monitoring.

5 CONCLUSION

The epidemiological analysis of occupational diseases in the city from 2015 to 2024 indicates that pneumoconioses are the most prevalent occupational diseases, closely linked to the city's resource-based economic structure. The results of this study have important guiding significance for occupational disease prevention and control. It is recommended to: Adopt targeted prevention and control strategies and strengthen pneumoconiosis prevention; Pay attention to emerging occupational health risks; Optimize resource allocation; Establish a key monitoring mechanism based on the length of exposure to comprehensively improve the effectiveness of occupational disease prevention and control.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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