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A Study on the Influencing Factors of the Occupational Health for Construction Workers

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Abstract: The construction conditions in the construction industry are complex, and workers face the long-term risk of occupational diseases. This paper takes the influencing factors of construction workers' occupational health as the research object, analyzes and studies the degree of influence, the classification results of factors, and the differences between different groups. Through literature review, 22 risk factors that construction workers often face during construction are selected, and a total of 110 valid data are collected in Jiangsu, Zhejiang, Shanghai, Tianjin, Beijing and Hebei using questionnaire surveys. After sorting the data, it is found that formaldehyde, Inhalable paint gas or steam, noise, cement dust, and high-altitude operations have a greater impact on workers' health. Further factor analysis points out that the sources of these factors can be divided into chemical and dust contact, mechanical equipment use, psychological and external environment changes. In addition, in the analysis of variance of workers affected by organizational psychological factors, it is found that workers with working experience of 16-20 years, a monthly income of more than 4001 yuan, and drinking habits are greatly influenced. This article also put forward measures to improve working conditions and strengthened the use of personal protective equipment among workers. These results will have a positive effect on the rational prevention of occupational diseases for construction workers.

Keywords: Construction worker; occupational health; occupational disease; cause of disease; analysis of influencing factors.

1. Introduction

As a high-risk industry, in the process of implementing activities, workers are often exposed to harmful substances in addition to potential harm. These substances pose

a serious threat to the health of construction workers. Although in the past few decades, the awareness of occupational health risks in construction industry had been continuously improved, the accident rate was still significantly higher than other industries [1]. Construction occupational diseases and pathogenic factors are diverse. Long-term exposure to different environments will increase the risk. For example, studies shown that long-term exposure to environments filled with asbestos fibers and low temperatures can increase the risk of asbestos lung and heart disease and probability of vascular disease [2,3]. It is a well-known fact that construction workers are exposed to bad environments and cause occupational injuries. In addition, gender, age, education level, job competence, income and health satisfaction are also closely related to individual workers [4]. In the face of risk, the life of construction workers is fragile, companies face also can't afford to loss, businesses and individuals all hope that such events can be reduced, therefore strengthening the identify of construction workers occupational health risks factors, will play a promoting role in protection for construction workers health, enhance the pertinence of the occupational-disease-prevention and improve the construction environment, etc.

According to the Health and Safety Executive (HSE), the UK construction industry has an average of 82,000 work-related illnesses (new or long-term) between 2015 and 2018, accounting for about 3.6% of the total number of employees, which is higher than the average prevalence of all industries. China National Health and Family Planning Commission issued the 2014 National Occupational Disease Reports in 2014, showing that China reported 26,393 occupational diseases in 2013. The coal, non-ferrous metals, machinery and construction industries had more occupational disease cases, accounting for 73.53% of the total number of reports. Therefore, the construction industry is generally regarded as an occupation with a high incidence of safety accidents and occupational health damage. In the construction process, the construction industry involves many types of work, such as painting, plastering, and moving heavy objects. Therefore, it is undeniable that the physical health of construction workers on the construction site is facing threats from gas, dust, noise and other aspects. Mild patients may have headaches, nausea, sneezing and other symptoms [5], while severe ones may suffer from asthma, cancer and other diseases [6].The International Labour Organization (ILO), while calling on the world to take urgent action against occupational diseases , pointed out that prevention is the key to solving occupational diseases. Therefore, it is an important segment of prevention of occupational diseases to enhance corporate and personal cognitive ability of risk factors.

The purpose of this study is to determine the most common factors affecting the occupational health of construction workers in China, rank them according to the

degree of influence of each factor on the occupational health of workers. And further determine the source of influence factors and the difference of influence among different groups through factor analysis and variance analysis. Although research has been conducted in all walks of life and other countries, the amount of research related to construction workers in China is still limited.In order to improve the status quo, this article aims to first determine an appropriate statistical method, screen out the 22 most common factors that affect the occupational health of construction workers, and determine the priority of the influencing factors, so as to determine the urgent problems to be solved and propose existing solutions Methods. Secondly, select appropriate analysis methods to reasonably classify the selected factors, and further analyze the differences between different groups, so as to more effectively identifying and prevent the influencing factors. The research results will help construction companies adopt scientific analysis and reasonable management measures to strengthen early prevention and control, thereby reducing the risk of workers suffering from occupational diseases, improving their own health, providing companies with long-term stable human resources, and improving corporate benefits. At the same time, it can also provide care and help to workers at higher risk of illness according to the actual situation, which will contribute to social harmony and stability and the sustainable development of the national economy.

2. Literature Review

One of the most destructive potential problems related to the construction industry is the possibility of occupational disease. The World Health Organization (WHO) defines occupational disease as any illness caused by risk factors of work activities. According to the theory of occupational safety, health and occupational diseases, in a broad sense, occupational diseases refer to diseases caused by harmful factors in the working environment acting on the body [7]. In China, occupational disease is provided a more detailed definition by The Prevention and Control Law, that is, workers of employers such as enterprises, institutions and individual economic organizations in their professional activities are sick due to exposure of dust, radioactive materials and other toxic and harmful factors [8]. Therefore, we must make it clear that occupational diseases are not equivalent to diseases. They have their own scope of application. Combined with epidemiological related theories, research issues should be placed on the field of specific groups, not just the disease itself, which will help prevent occupational diseases and protect the health of the population.

At this stage, in the existing literature, there are few literatures for statistics and research on the pathogenic factors of construction occupational diseases. Liu Lina et al used the stratified cluster sampling method to study the health status and

influencing factors of construction workers in Weihai City, Shandong Province, and found that workers' self-rated health status was significantly related to gender, age, education and marital status [9]. Han Tongzhen et al used one-way analysis of variance and logistic regression analysis to study the impact of different factors on occupational injuries of construction workers. The results showed that in terms of education level, job competence, income satisfaction, and health satisfaction, there are significant differences among different groups [10]. Fu Yu conducted a research on the health status of migrant workers in the construction industry in Taiyuan City. The research found that the health status of construction workers is different among different income groups, with the increase in income, the health status gradually improves [11]. The above research shows that: (1) The research on the health status of the construction worker mainly focuses on the occupational health field or the social environment, organizational environment and other macro-levels, and there is a lack of analysis of the direct harmful factors that cause illness in construction workers; (2) Questionnaire Method and analysis of variance are commonly used methods for the analysis of factors affecting workers' occupational health.

In order to improve this situation, we used "occupational health", "occupational disease", "occupational poisoning", "occupational hygiene", "occupational hazards", "construction workers", "workers' health", "migrant workers", "workplace "", "Safety Management" and other keywords, searched "Elsevier", "EI", "Web of science", "CNKI", "Wanfang" and other databases from 2000-2019 related 95 documents, At the same time, a total of 34 influencing factors were screened by referring to the classification catalog of Chinese occupational hazards. On the basis of these factors, three aspects had been considered:(1)Relate to construction activities; (2)Literature has shown that exposure to this factor will pose a threat to human health;and (3) Can be normally detected.

In the end, this article identified 22 factors that have an impact on the occupational health of construction workers. In order to facilitate subsequent research, we numbered these influencing factors and compiled the following Table 1.

Table 1 Experimental matrix Ethanol and methanol to the main diesel fuel

No.	Influence factors	Occupational diseases
1	Asbestos dust	Asbestos lung, Mesothelioma, Pleural stromal tumor
2	Cement dust	Lung dysfunction, Tuberculosis, Cancer
3	Wood dust	Pharyngeal carcinomatosis, Respiratory tract lesions, Chronic bronchitis, Rhinitis, Lung damage

4	Gypsum dust (calcium sulfate)	Bronchitis
5	Silica dust	Pneumoconiosis, chronic Bronchitis, Emphysema
6	Welding and cutting fume	Pneumoconiosis, Chronic bronchitis, Occupational asthma, Aerosol, Cancer
7	Asphalt smoke	Lung cancer, Head and neck cancer (Oral cancer, Throat cancer, Esophageal cancer)
8	Nitric oxide	Multiple myeloma, Chronic bronchitis
9	Epoxy resin	Eczema, Allergic contact dermatitis
10	Respirable paint gas or steam	Lung cancer, Bladder cancer
11	Formaldehyde	Allergies, Abnormal lung function, Abnormal liver function, Abnormal immune function, etc., Cancer
12	Ammonia	Rhinitis, Pharyngitis, Bronchitis
13	Ultraviolet	Skin cancer, Sunburn, Welder burns
14	High temperature	Heat stroke, Heat syncope, Heat exhaustion
15	Low temperature	Increased risk of low back pain and neck pain, Arthritis, cardiovascular and cerebrovascular diseases
16	Vibration	Musculoskeletal disease, Arm vibration disease
17	Noise	Hearing loss, Noise deafness
18	Repetitive action / Cumulative trauma	Musculoskeletal diseases, Back pain, Neck and shoulder pain, Tendonitis, Bowl tube syndrome
19	Poor lighting	Rapid fatigue, Headaches, Decreased concentration
20	Working loft	Prone to fatigue
21	Psychological stress	Hypertension, Depression
22	Shift work	Cardiovascular diseases, Gastrointestinal disorders

The method used in this study is statistical in nature and includes the following steps: (1) Literature review, summarizing common types of construction occupational diseases and pathogenic factors; (2) Research methods, using ranking method, factor analysis and analysis of variance; (3) Research results and findings; (4) Discussion;

and (5) Conclusion.

3. Methodology

This paper adopted a questionnaire survey to collect data. The purpose of the questionnaire was to investigate the construction workers' cognition of different factors' influencing on the body, and on this basis, analyzed the main occupational diseases and risk factors that affect the health of construction workers. The questionnaire survey method is a widely used research method. It has high efficiency, can cover many people in a short time, and the content of the survey is objective, and the respondents have no concerns. In addition, the study requires the use of statistical methods for description and analysis. Currently, China still lacks a database of occupational disease influencing factors of construction workers, so it is a good decision to use questionnaires.

The research objects were three types of work that are common to housing construction projects and face many risk factors: concrete workers, carpenters and steel bars workers. The questionnaire was mainly divided into two parts. The first part was the background of the respondent, including the interviewee's basic information (gender, age, education, etc.), basic situation (drinking status, working experience in the construction industry, smoking status, health status, etc.).; in the second part, 22 influencing factors were listed and the impact degree of each factor was scored using five-point Likert scale: 1=no effect , 2=almost no effect, 3=generally, 4=more influential , 5=very influential, ensure the authenticity of the data, each factor was added with a "don't know" option, and the unknown options were treated as missing values. To ensure data integrity, the average value were used for missing data Substitution method was to use the average number of observations of the variable in the case to replace the data that does not know the option. Accordingly, in order to find out the internal connections of various influencing factors and further understand the differences between different groups, some statistical methods were used for this purpose. For example, the factor analysis method was used to classify different factors, and the one-way analysis of variance method was used to investigate the relationship between working age, age, drinking habits and influencing factors.

4. Results and analysis

4.1 Questionnaire Survey

The questionnaire was distributed on-site or filled out online. Considering the research purpose and convenience of the questionnaire, this study selected some housing projects in central and eastern China. The respondents were concentrated in Jiangsu-Zhejiang-Shanghai region, Beijing-Tianjin-Hebei region, very few come from the

surrounding areas of Beijing-Tianjin-Hebei region, such as Henan and Shandong provinces. These areas are strategically important development areas of the country, so they are more representative and more conducive to the conduct of this research. A total of 140 questionnaires were retrieved in this survey, including 110 valid questionnaires in 78.57%. The information of the respondents is shown in Table 2. Based on this, the following analysis and research were carried out.

Table 2 Basic situation of the respondent

Basic information		Value	Percentage(%)
Gender	male	85	77
	Female	25	23
Age	Under 25	41	37
	25-30 years old	21	19
	31 years old -40 years old	12	11
	41 years old -50 years old	16	15
	Over 50 years old	20	18
Education	Elementary school and below	15	14
	Junior high school	23	21
	Technical secondary school	7	6
	High school	3	3
	College and above	62	56
Seniority	5 years and below	66	60
	6-10 years	11	10
	11-15 years	6	6
	16-20 years	18	16
	21 years or more	9	8
Drinking situation	Not drink at all	18	16
	Rarely drink	35	32
	Sometimes drink	34	31
	Drink often	21	19
	Always drink	2	2
Smoking	No smoking	61	56
	Less than 5 per day	13	12
	6-10 per day	9	8
	11-20 per day	20	18
	1 pack or more per day	7	6

4.2 Influencing Factors of Construction Workers' Occupational Health

In order to verify the reliability of the questionnaire data, this study used the Cronbach reliability coefficient to test. Cronbach's alpha is often used to measure whether the results of the sample answers are reliable, and to determine the internal consistency within the range of 0-1. After calculating the overall Cronbach coefficient of the questionnaire is 0.967 greater than 0.7, the questionnaire has acceptable reliability, so it can be considered that the validity of the questionnaire design is good.

In order to obtain the ranking results of the degree of influence of different factors, the mean and standard deviation of each influencing factor were calculated. The results are shown in Table 3. If the average of two or more factors was the same, the standard deviation were compared, so the smaller the standard deviation, the higher the ranking. Among the influencing factors of occupational health of construction workers, the highest average value was 3.528 and the lowest was 2.917, indicating that construction workers have different perceptions on these factors. Among the influencing factors of construction workers' occupational health, the top-ranking factors were formaldehyde (3.528), respirable paint gas or steam (3.505), noise (3.413), cement dust (3.407) and working aloft (3.398).

Table 3. Ranking of risks affecting construction workers' occupational health

Influence factors	Mean	Standard deviation	Sort
Formaldehyde	3.528	1.3025	1
Respirable paint gas or steam	3.505	1.3772	2
Noise	3.413	1.1022	3
Cement dust	3.407	1.2043	4
Working loft	3.398	1.2775	5
Silica dust	3.355	1.2285	6
Shift work	3.340	1.2554	7
Psychological stress	3.321	1.1377	8
Ultraviolet	3.300	1.1852	9
Welding and cutting fume	3.262	1.2919	10
Asbestos dust	3.221	1.2263	11
Gypsum dust	3.190	1.2857	12
Vibration	3.165	1.1926	13
Nitric oxide	3.158	1.1710	14
Epoxy resin	3.150	1.1760	15
Repetitive action / Cumulative trauma	3.147	1.2694	16
High temperature	3.138	1.1767	17

Ammonia	3.102	1.1533	18
Asphalt smoke	3.081	1.2827	19
Wood dust	3.028	1.1998	20
Low temperature	2.925	1.0896	21
Poor lighting	2.917	1.1424	22

Formaldehyde pollution has always been concerned by the public. In the building environment, formaldehyde mainly comes from building boards and interior wall coatings. The direct harm to formaldehyde to the respiratory system is manifested in the increased incidence of upper respiratory symptoms and signs, such as chest tightness, sputum, cough symptoms, etc., severe cases will increase the risk of cancer. In an experiment simulating formaldehyde pollution in the built environment, it was found that formaldehyde can cause pathological damage to the lung tissue of mice [12]. Currently, the International Agency for Research on Cancer (IARC) had listed formaldehyde as a possible carcinogen and long-term exposure to formaldehyde will increase the risk of nasopharyngeal cancer [13]. Some studies had pointed out that by improving the indoor temperature and ventilation environment, it can significantly promote the formaldehyde emission [14].

Oil paint contains a lot of volatile chemicals, including various pigments, solvents, and adhesives (resins). Epidemiological studies had shown that there is a causal relationship between occupational exposure to painters and cancers such as lung cancer. Long-term exposure to paint gas or steam can cause symptoms such as coughing, fatigue, and weakness in the limbs. Zhang Jianli et al. also found that the appearance of the cleft lip and palate fetus is related to the mother's exposure to paint in the study of the relationship between neonatal cleft lip and palate and the female painter's pathogenic factors [15]. And its occurrence was closely related to working hours. Relevant departments can take preventive measures, such as strengthening building ventilation, environmental monitoring and promptly reminding workers to wear protective equipment.

Noise is universal in the construction industry, and has the characteristics of high level and various sources [16]. On-site noise is usually above 90dB, or even more than 130dB, which will cause serious damage to human hearing, even deafness and abnormal physiological functions [17]. Leensen et al. found that at high noise levels, workers wearing protective measures have much lower hearing loss than those who don't wear hearing loss [18]. At the same time, Zhang Changyou et al. also pointed out that starting from sound sources, transmission channels, production technology and management can reduce the impact of noise on human health [19].

Cement can generate a lot of dust during transportation and use. These dusts can

enter the human body through skin, eye contact and breathing, decreasing the worker's breathing ability and increasing risk of chronic respiratory diseases and gastric cancer [20]. Therefore, wearing dust-proof clothing and dust masks with other measures can effectively reduce the damage to the respiratory system caused by dust.
Working aloft is common in various construction projects, High-altitude operators have heavy tasks and complex operating environments. Compared with ground workers, there are certain differences in working postures and physiological responses, which makes some simple grassroots work more difficult in high-altitude operations [21,22]. Chang et al. discussed the physical and psychological fatigue impact of occupation on the high-altitude workers. The results showed that the probability that scaffold workers became fagged were significantly higher than other workers. For scaffolders, they should not only pay attention to professional training, but also strengthen psychological guidance [23].
Low temperature and poor lighting were the last two factors in the ranking of this study. Studies had shown that working in a cold environment could lead to an increasing risk of musculoskeletal diseases, such as shoulder, neck, or lower back pain [24]. A potential mechanism may be that working in cold conditions can cause higher muscle load. Poor lighting at the construction site will cause workers to experience rapid fatigue, headaches and other symptoms, which are manifested by decreased attention and mental stress [25].
In the actual investigation, it was found that workers believed that low temperature and poor lighting had a low impact on health. The reasons may be related to the following factors: 1. The respondents are mainly from construction projects in Shanghai, Zhejiang and Beijing-Tianjin-Hebei region. These areas are not high-cold areas, and some areas prohibit winter construction due to policy reasons, greatly reducing the length of construction workers in cold conditions; 2. In order to ensure the safety and quality of construction, the construction unit has recognized the importance of lighting conditions for night construction. Therefore, the on-site lighting environment rarely interferes the normal work of workers.
For the top-ranking factors, priority should be given to occupational health protection. In addition, in order to test the basic relationship between these factors and determine the source of the influencing factors, further analysis of the data was carried out on this basis, and a factor analysis was carried out on the influencing factors.

4.3 Factor Analysis

For the factors of disordered dispersion, the KMO test (Kaiser-Meyer-Olkin) and Bartlett spherical test can be used to verify the correlation between various factors and determine whether they are suitable for factor analysis [26]. The value range of KMO is 0 to 1. Value greater than 0.700 is "more appropriate. Bartlett spherical test P

values is less than 0.05, which is statistically significant [27,28]. The analysis results are shown in Table 4, the KMO value of 0.933 was very suitable for factor analysis. And P values 0.000 was less than 0.05, rejecting the null hypothesis. In summary, for the data in this study, the premises in the factor analysis were met.

Table 4. KMO and Bartlett's test.

KMO sampling suitability		0.933158385
Bartlett ' S ball test	Approximate chi-square	2175.93368
	Degrees of freedom	231
	Significance level	0

The factor analysis was carried out using SPSS 24.0, and four common factors were extracted. The eigenvalues were 13.022, 1.533, 1.038, and 0.876. The four factors together explained 74.859% of the variance. The factor rotation used the maximum variance method to extract four common factors of 22 influencing factors, as shown in Table 5.

Table 5. Classification of factors influencing occupational health of construction workers

Factor 1: Influencing factors of chemical and dust generation	Factor 2: Influencing factors generated by mechanical equipment	Factor 3: Influencing factors of organizational psychology	Factor 4: Influencing factors generated by the external environment
Asbestos dust	Cumulative trauma of repetitive movements	Shift work	High temperature
Gypsum dust	Noise	Working loft	Low Temperature
Silica dust	Poor lighting	Psychological stress	Ultraviolet
Cement dust	Vibration	—	—
Wood dust	—	—	—
Welding and cutting fume	—	—	—
Asphalt smoke	—	—	—
Nitric oxide	—	—	—
Epoxy resin	—	—	—
Ammonia	—	—	—
Respirable paint gas or steam	—	—	—
Formaldehyde	—	—	—

Common factor 1: The influencing factors of chemical and dust generation, including

all the chemical and dust factors listed in Table 1. These factors were harmful to the human body and easy to be found intuitively, and could enter the human body through breathing and contact, causing workers to suffer from related diseases.

Common factor 2: Influencing factors generated by mechanical equipment, these factors were related to the use of mechanical equipment. The noise generated by mechanical equipment will cause workers to have hearing loss, noise deafness, etc., and long-term use of vibration tools or maintain the same posture, will increase the risk of workers suffering from musculoskeletal diseases.

Common factor 3: Influencing factors of organizational psychology. The literature showed that shift work is related to peptic ulcers, coronary heart disease and adverse pregnancy outcomes [29]. In addition, shift work had also been pointed out as a potential source of social and psychological pressure, which had a negative impact on mental health. Therefore, these factors were all related to psychology [30]. And over time, the impact on work and family stress can lead to negative indicators of hypertension and physical and mental health issues [31].

Common factor 4: Influencing factors generated by the external environment, these factors were all related to the construction environment. Under high temperature and high humidity conditions, workers are more likely to suffer from heat-related diseases [32]. Under high ultraviolet radiation levels, workers will face higher risk of skin cancer [33], and low temperature will increase the risk of musculoskeletal diseases for workers.

In order to analyze the differences between different groups and to further confirm whether the construction workers are affected by various factors in terms of gender, age, etc., this study conducted a single factor analysis of variance between the four common factors. Table 6 shows groups of different working ages, incomes, and alcohol consumption affected by organizational psychology differently. Table 7 shows the post-test of the three sets of data used LSD method (Least—Significant Difference).

Table 6. ANOVA (influencing factors of organizational psychology)

	Seniority	income	Drinking situation
F value	2.510	2.466	3.763
Distinctiveness	0.046	0.049	0.007

Table 7. Multiple comparisons (influencing factors of organizational psychology)

Group	Category One	Category 2	Mean difference (I-J)	Standard error	Distincti-veness	95% confidence interval	
						Lower limit	Upper limit

Seniority	16-20 years	5 years and below	.65414*	0.25737	0.012	0.1438	1.1645
		21 years and above	.80042*	0.39514	0.045	0.0169	1.5839
Income (after tax)	4001-6000 yuan	1000 yuan and below	1.09343*	0.37438	0.004	0.3511	1.8358
	6001 yuan and above	1000 yuan and below	.77301*	0.38542	0.047	0.0088	1.5372
Drinking situation	Sometimes drink	Not drink at all	.87243*	0.27618	0.002	0.3248	1.4200
		Rarely drink	.51937*	0.22815	0.025	0.0670	0.9717
	Drink often	Not drink at all	.91078*	0.30433	0.003	0.3073	1.5142
		Rarely drink	.55772*	0.26152	0.035	0.0392	1.0763

Note: *. The significance level of the average difference is 0.05, and the LSD method is used. Due to the limited space, the insignificant part has been eliminated.

Workers with 16-20 years of service had significant differences on the influence which organizational psychological factors exert on occupational health compared with workers with a working age of less than 5 years and 21 years. Workers with incomes of 4001-6000 yuan and 6001 yuan and above were significantly different from workers with incomes of 1,000 yuan and below in terms of the impact extent of organizational psychological factors on occupational health. Construction workers whose income are 4001-6000 yuan and 6001 yuan and above were more affected by this factor than workers whose income are1,000 yuan and below. Workers who sometimes drink and drink frequently had significant differences in terms of organizational psychological factors' influence on occupational health compared with workers who do not drink at all and those who rarely drink.

5. Discussion

When construction workers are engaged in production activities, they are often exposed to harmful substances. This paper found that formaldehyde, respirable paint gas or steam, noise, cement dust and working aloft were the main factors affecting the occupational health of construction workers by calculating the average and standard deviation from 22 influencing factors. Long-term exposure to environments containing these factors had been proven to be associated with respiratory diseases, lung diseases, hearing loss and physiological diseases. This is consistent with the results of a study aimed at identifying the most important occupational diseases in the construction industry. The article pointed out that in China, non-joint diseases are more common, especially lung diseases [34]. This may be related to the worker's sensitivity to pungent gas, noisy environment and floating dust, when the worker is exposed to these factors, the body will soon experience discomfort.

In order to analyze whether there is a difference in the impact of these risk factors on different groups of workers. This study used factor analysis to extract 4 common factors from 22 influencing factors, and each factor explained the source of different factors, including the contact of chemical and dust, the use of mechanical equipment, the changes of psychological and external environment. The results of factor extraction will help to improve the ability to distinguish and identify occupational health influencing factors.

After performing a single factor analysis of variance between the four factors, it was found that there was only a significant relationship between working age, income and alcohol consumption and the common factor 3 (influencing factors of organizational psychology), which was found after multiple comparisons using LSD; workers whose working experience was 16-20 years were greatly affected by factors resulting from organizational psychology. The reason can be explained by a new study, which found that age has a moderating role in the three specific work-related resources of work (supervisor, organization, and perceived stress). When there are fewer resources in the working environment, the older employees are under greater pressure than younger ones [35]. In addition, this study also found that high-income groups are significantly different from low-income groups in terms of the impact on organizational psychological factors such as shift work and high-altitude pressure. This means that high-income construction workers usually face more organizational problems and psychological pressure, which mainly come from family, skill level, etc. Similarly, workers that have a certain drinking habit were significantly more affected by this factor than workers that rarely drink or do not drink at all. Some studies have pointed out that the daily tension and psychological needs of workers are important factors leading to workers' drinking behavior [36]. Therefore, cultivating workers' good psychological quality will help to improve workers' drinking situation. The results of this study further explain that the reason why the health status of some construction workers varies among different groups is that different groups are affected by different factors and thus affect the health status of the body. In contrast, this study focused more on occupational diseases and hazard factors, and investigated the differences in the incidence of the same occupational diseases among different groups. This will be more conducive for enterprises or individuals to implement more targeted risk identification and prevention strategies.

In addition, this research has the following limitations: 1. Concrete workers, carpenters and steel bars workers are selected as the survey objects. In fact, construction projects are often multi-type and multi-stage, and a more comprehensive study should be conducted on each type of work and construction stage; 2. There are differences in the risk cognition abilities of grassroots construction workers. To ensure the

authenticity of the questionnaire data, the "I don't know" is added to the five-level Likert scale, resulting in missing values. General statistical processing methods have been adopted, but they will inevitably have an impact on the analysis results; 3. Construction workers face more than 22 hazardous substances in actual work, and some insignificant factors have been eliminated in the pre-investigation stage , Such as radon, mold, high altitude hypoxia, etc., we look forward to research to conduct a more complete analysis of influencing factors in the follow-up. In addition, in order to carry out related research work more deeply, risk assessment of each factor can be conducted, and a corresponding risk quantitative evaluation system can be established. In summary, accurate identification of risk factors were the key points when strengthening construction workers' occupational disease protection. Secondly, relevant departments should also improve the following aspects: improving the working environment, such as selecting green building materials, improving on-site ventilation conditions, etc., strengthening the investment and use of protective equipment, such as dust masks, soundproof earplugs, etc., and paying attention to workers' standard operation and psychological guidance.

6. Conclusion

In this study, 22 kinds of risk factors affecting the occupational health of construction workers were selected, and the five factors that had the greatest impact on the occupational health of construction workers were determined by calculating the scores that are formaldehyde, respirable paint gas or steam, noise, cement dust and working aloft respectively. In order to test the basic relationship between various factors and further verify whether the construction workers are affected by these factors in terms of gender, age, etc., factor analysis and analysis of variance were conducted. The results of factor analysis showed that construction workers believe that the risk factors mainly come from the contact of chemical and dust materials, the use of mechanical equipment and psychological and environmental changes. The results of analysis of variance showed that there are significant differences on the influence organizational psychological factors exert on occupational health among workers with a working age of 16-20 years, an income of more than 4,000 yuan, and sometimes and frequently drinking alcohol. One of the most important findings of the research is the identification of the factors affecting the occupational health of construction workers and the ranking of the degree of influence. The research results are universal. The construction unit can be used to identify the on-site risk factors and confirm the priority of the risk degree in order to adopt the best protection strategy can reduce the risk of workers suffering from occupational diseases and improve their own health. At the same time, it can also provide care and help to workers at higher risk of illness

according to the differences between different groups. These will provide enterprises with long-term Contribute to stabilizing human resources and improving corporate efficiency. They have a positive effect on the identification and prevention strategies of occupational diseases in the construction industry, but also help to improve the construction environment, and raise construction workers 'awareness on occupational disease prevention. It has a positive effect on rationalizing the prevention of occupational diseases for construction workers.

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