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Depressive Symptoms and Associated Factors among Employees in Public Utility Places of Zhejiang Province, China

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Abstract: Depression has been known to adversely influence the working performance of employees. However, compared with physical health, few studies have reported the prevalence of depressive symptoms among employees in workplaces. This study aimed to investigate the current situation and the relationships among the prevalence of depressive symptoms, physical health, social–psychological factors, working conditions, environmental perception, and workplace performance of employees in public utility places in Zhejiang Province, China. A cross-sectional study was conducted during the fourth quarter of 2019. A total of 1232 individuals responded to the survey. Six types of information—sociodemographic characteristics, working conditions, psychosocial factors, four groups of physical symptoms, working performance, and depressive symptoms—were collected. Logistic regression analysis was performed. The survey results showed that the prevalence of depressive symptoms among employees in public utility places in Zhejiang Province was 17.9%. Perceptions of a poor work environment, poor interpersonal relationships, an unfulfilling life, and frequent ocular and general uncomfortable symptoms were associated with a higher risk of depressive symptoms. Strong work ability, fulfilment in life, and taking the initiative to wear or use protective equipment at work were associated with a lower risk of depressive symptoms. The results of this study will provide valuable guidance for the scientific intervention for depressive symptoms among public utility place employees in the future.

Keywords: public utility places; depressive symptoms; physical symptoms; psychosocial status; working conditions; working performance

Citation: Wu, L.; Li, X.; Tu, P.; Wang, X.; Chen, Z.; Xing, M. Depressive Symptoms and Associated Factors among Employees in Public Utility Places of Zhejiang Province, China. *Sustainability* **2023**, *15*, 13573. https://doi.org/10.3390/su151813573

Academic Editor: Gianpiero Greco

Received: 1 August 2023
Revised: 5 September 2023
Accepted: 9 September 2023
Published: 11 September 2023

1. Introduction

Public utility places are artificial environments comprising public buildings and facilities that provide work, study, entertainment, and social activities for the public. Generally, "public" means sponsored by the government. Here, it means a place with characteristics of a dense population, large personal mobility, and higher contact opportunities [1]. The public utility places in this study belong to the scope that was referred to in the Chinese national health standard [2]. Due to the characteristics of "public" places, public utility places provide a favourable environment for the transmission of infectious diseases, such as COVID-19 [1].

In the past, most of the reports about public utility places focused on monitoring the physical, chemical, and biological indicators of the indoor environment, and the object of health protection was more focused on consumers [3]. However, compared to consumers, employees spend a longer time in public utility places. Moreover, as the creator and sustainer of environmental sanitation, the health of employees in public utility places and the hygiene of the indoor environment are related [4,5]. So, it is also very necessary to pay attention to the health of employees in public utility. Previous reports on the topic of health effects caused by the indoor environment are limited. Some are only concerned

about the impact of physical health, while others focus only on emotional disorders or work performance [6–8]. Less research has been conducted on all three factors on employees simultaneously in China compared to in developed countries [9]. Psychological health problems may seem silent, but they can gradually damage physical health, eventually leading to a significant decrease in productivity [10]. According to the WHO, depression is the most common type of mental disorder, affecting an estimated 350 million people. Approximately 1 in every 20 individuals worldwide are affected by depression. Globally, depression is ranked as the fourth largest social burden of all diseases in terms of disability-adjusted life years [11,12]. China's situation is also urgent. Depression has risen to become the second largest disease burden on the mainland since 1990 [13]. It poses a substantial economic burden at individual and societal levels [14], since depression is most common between the ages of 25 and 44, which is the prime working age range [15]. Furthermore, the study scopes of existing reports are also limited, focusing primarily on hospitals and doctors [16], schools and teachers [17], and offices and administrative personnel [18]. Based on the above situation, it is of significant societal relevance to expand the research on the multifaceted effects of different indoor environments on the physical health, depression, and work performance of employees.

According to the concept of disorder diagnosis, depression is a mood disorder characterized by a loss of interest; sleep disturbance; weight change; fatigue; decreased energy; slowness of movement; guilt or feeling that life is meaningless; reduced ability to think, concentrate, and make decisions; and suicidal tendencies [19]. Early detection and treatment are important for recovery from depressive disorders. The later the treatment, the more difficult it is to treat, the higher the possibility of relapse, the greater the damage to social functions, and the more difficult it is to recover. Therefore, the timely recognition of depressive symptoms is essential. In this study, the patient health questionnaire (PHQ-9) scale was used to screen and evaluate depressive symptoms. PHQ 9 is not a diagnostic scale because diagnosing depression is a very complex, comprehensive assessment process that requires a professional psychiatrist. Owing to its good reliability and validity, the PHQ-9 has been widely used in the screening and evaluation of depressive symptoms, and the Chinese version has been verified in China [20–25].

In a word, this study aimed to investigate the current situation and the relationships among the prevalence of depressive symptoms, physical health, social–psychological factors, working conditions, environmental perception, and workplace performance of employees in public utility places in Zhejiang Province (Figures 1 and 2). This is a new exploration of the comprehensive mutual influence between the indoor environment and employees of public utility places in Zhejiang Province. It will provide a scientific reference for appropriate interventions for and the feasible prevention of depressive symptoms in employees in public utility places in the future.

Figure 1. Various public utility places in this study.

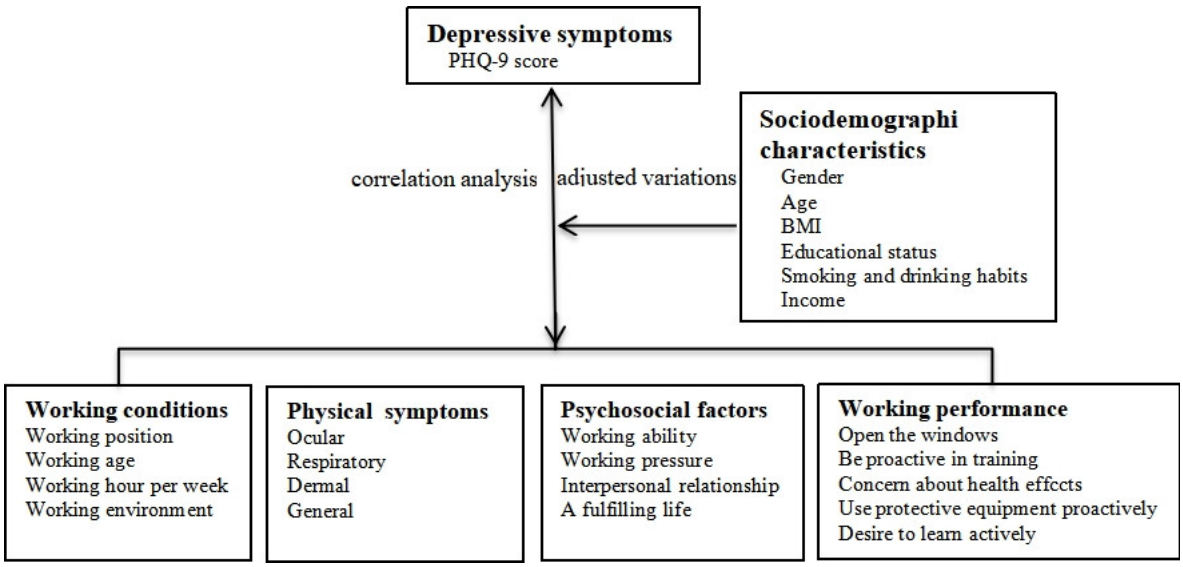

Figure 2. The exploration framework of this study.

2. Materials and Methods

2.1. Data Collection

This cross-sectional study was conducted in the fourth quarter of 2019 in Zhejiang Province, China. A total of 1232 individuals from four cities (Huzhou, Jiaxing, Shaoxing, and Wenzhou) who worked in public utility places responded to the survey. All participants from 232 public utility places provided consent to participate by completing the questionnaire. Public utility places include hotels, indoor swimming pools, indoor public baths, barbershops, beauty salons, and waiting rooms at railway stations. The four cities represent different regions of Zhejiang Province, which is located in eastern China and has a relatively balanced regional economy. A two-stage sampling technique was used to recruit respondents. In the first stage, at least 18 hotels (derived from three different grades according to the star level), 6 indoor swimming pools, 8 indoor public baths, 8 barbershops, 8 beauty salons, and 2 waiting rooms at railway stations were selected using a simple random sampling technique. In the second stage, ten individuals with more than one year of service were selected from every public utility place, or all were recruited for the survey when there were less than ten in the working environment. The sample size was calculated using the software PASS 11, with the parameters as follows: 20% prevalence of depression [26], confidence level (1-alpha) of 0.95, and confidence interval width (two-sided) of 0.05.

2.2. Self-Assessment Questionnaires

The self-administered questionnaire consisted of six parts: personal characteristics, working conditions, psychosocial factors, four symptom groups, performance, and the PHQ-9 scale.

Questions on personal characteristics and working conditions included age, sex, height, weight, education, income, smoking and drinking status, the job position, working years, working hours per week, and perceived environmental conditions. In this study, height and weight were self-reported rather than measured in the field. Body mass index (BMI) was calculated by using the weight in kilograms divided by squared body length in meters.

Questions on perceived environmental conditions included 13 items: noise, dryness, humidity, temperature perturbation, pungent smell, musty smell, smelly tap water, unclean sanitation facilities, four pests, dusty air, lack of sunlight, disinfectant odour, and poor ventilation. There were 5 options for each answer: (1) always, (2) often, (3) sometimes, (4) occasionally, and (5) never. When analysing, responses were adjusted into dichotomous variables. A response of "often" or "always" was categorized into the "poor" group, and

others were categorized into the opposite group. As long as one of the 13 item responses was "always" or "often", the perceived environmental conditions were qualitatively interpreted as poor.

Questions regarding psychosocial factors included working ability, workload, relationships, and life situations. They were assessed with the following questions: "How do you feel about the workload/work ability/relationships in the last month?" and "Do you have a fulfilling life in the last month?". The responses of workload were divided into the following categories: very heavy, heavy, average, easy, and very easy. Other items were also divided into five categories: very poor, poor, average, good, and very good. When analysing the results, these five items were adjusted into dichotomous variables according to the following principles: responses of the first three levels were coded and grouped together, and responses of the last two levels were combined.

Four groups of symptoms were surveyed using sick building syndrome (SBS) data obtained from a variety of literature sources: ocular (pinkeye, itching, burning, lacrimation, dry eye, and eyestrain), respiratory (itchy nose, sneeze, runny nose, stuffy, expectorate, dry throat, aphonia, and cough), dermal (dryness, itching, flushed skin, chapped skin, and skin prick) and general (diarrhoea, fever, sore muscle, lumbago and back pain, arthrodynia, dysacusis, tinnitus, stomatitis, fatigue, headache, nausea, drowsiness, and memory lapses). For every symptom, there were five categories of responses, namely, "always", "often", "sometimes", "occasional", and "never". The participants who reported experiencing at least one symptom in every group "always" or "often" during the last month were assigned to the category of positive symptom in ocular, respiratory, dermal, or general symptoms.

In terms of performance, we designed five questions for information collection based on the characteristics of the workplace. ① Do you actively open windows for ventilation when working? ② Are you proactive in health knowledge training? ③ Are you concerned about the possible health effects at your location? ④ Do you take the initiative to wear or use protective equipment at work? ⑤ Would you like to learn more about health at your workplace? There were five options for each answer: (1) always, (2) often, (3) sometimes, (4) occasionally, and (5) never. Respondents who chose "often" or "always" were included in the good behaviour category.

Depressive symptoms were assessed using the PHQ-9. The PHQ-9 consists of nine questions related to the key symptoms of depression; each item is scored from 0 to 3, giving a total score of 27 [27], and the Level 4 score is based on the frequency of symptoms within the last two weeks. A score of 0 indicates no symptoms, 1 indicates symptoms occurring for a few days, 2 indicates symptoms occurring for more than seven days, and 3 indicates symptoms almost every day. Items 1, 4, and 9 are the core items in the scale, and any score > 1 (i.e., selections 2 and 3) requires attention. The symptoms in items 1 and 4 represent the core symptoms of depression. Item 9 represents the intention to self-injure. For most analyses, the PHQ-9 score was divided into the following categories of increasing severity: 0–4, 5–9, 10–14, 15–19, and 20 or greater. They suggested the possibility of mild, moderate, moderately severe, or severe depression, respectively. The PHQ-9 has been reported to be a valid measure of depressive symptoms, with scores below 5 almost always signifying the absence of depressive disorder. Following previous papers [9,27–30], the cut-off point for the objective variable, namely the PHQ-9 score, was 5 points in this study. Cronbach's alpha was 0.963, and the factor loadings ranged between 0.675 and 0.821. The cumulative variance contribution rate (CVCR) was 0.595, and the correlation coefficients between each item and the total score ranged from 0.377 to 0.848 ($p < 0.01$), indicating that the scale had good reliability and validity.

2.3. Statistical Analysis

IBM SPSS version 25.0 (IBM Corporation, New York, NY, USA) was used for the analysis. Data with missing values for any variables were excluded from the analysis. Valid data were described and analysed by using frequencies and percentages. We transformed the variables into the classification grades according to the principles described in the

Methods section and then performed binary logistic regression analysis on the classification variables [6,9]. In the regression analysis, the dependent variable was depressive symptoms, and others, including sociodemographic characteristics, working conditions, psychosocial factors, symptoms of different systems (ocular, respiratory, dermal, and general), and performance, were the independent variables. Potential risk factors ($p < 0.05$) from the univariate analyses were included in the multivariate stepwise logistic regression analysis (forward LR), and the *p*-values for the entry and removal of variables in the stepwise logistic regression model were 0.05 and 0.1, respectively. Two models of multivariate logistic regression were run, depending on whether demographic variables were adjusted or not. The odds ratios and 95% confidence intervals (CIs) were also calculated. Any effect at $p < 0.05$ was considered significant.

2.4. Ethics

Ethical approval was obtained from the Ethical Review Committee of the National Institute of Environmental Health, Chinese Center for Disease Control and Prevention (approval no. 201821). Written informed consent was obtained from all participants during the study period. Participants were allowed to withdraw from the study at any time. Scores of 5 points or more in the survey were followed by timely feedback face-to-face or via telephone.

3. Results

3.1. Sociodemographic Characteristics of Participants

A total of 1232 questionnaires were collected, and 1184 valid questionnaires were completed after removing invalid questionnaires. The response rate was 96.1%. The participants' characteristics are shown in Table 1, and their key features are described below.

Table 1. Sociodemographic characteristics of participants (N = 1184).

Variable		n	(%)
Gender	Male	405	(34.2)
	Female	779	(65.8)
Age (year)	<40	773	(65.3)
	≥40	411	(34.7)
BMI	<18.5	143	(12.1)
	18.5–23.9	817	(69.0)
	≥24	224	(18.9)
Educational status	Below university level	964	(81.4)
	Graduate and above	220	(18.6)
Do you smoke	No	1027	(86.7)
	Yes	157	(13.3)
Do you drink	No	947	(80.0)
	Yes	237	(20.0)
Income ($\times 10^4$ CNY/year)	<5	270	(22.8)
	5–9.9	486	(41.1)
	≥10	428	(36.2)

Among the 1184 participants, 65.8% were female, and the rest were male. More than half of the participants (65.3%) were younger than 40 years of age. Regarding BMI, 12.1% had a score less than 18.5, and 18.9% had a score of 24 or above. Only a few (18.6%) had completed college or university education. Most participants had no history of smoking (86.7%) or alcohol consumption (80.0%). The income level of the participants was as follows: <50,000 CNY/year, 22.80%; 50,000–99,999 CNY/year, 41.1%; and ≥100,000 CNY/year, 36.2%. Of these, only 24.7% held managerial positions. As for the period of working age,

most of them had worked for less than 5 years, accounting for 69.3%, and most of them (84.1%) worked more than 40 h weekly.

3.2. Distribution of Depressive Symptoms in the Participants

The PHQ-9 scale was used to assess depressive symptoms in the participants, and the scores are shown in Table 2. Among them, 972 people with scores of 0–4 (no depression) accounted for 82.1%, 162 people with scores of 5–9 (mild depression) accounted for 13.7%, 31 people with scores of 10–14 (moderate depression) accounted for 2.6%, 13 people with scores of 15–19 (moderate to severe depression) accounted for 1.1%, and six people with scores of 20–27 (severe depression) accounted for 0.5%. Taking five as the cut-off point, the total number of people with scores of more than five was 212, accounting for 17.9%.

Table 2. The distribution of different depressive symptoms based on PHQ-9 scale (N = 1184).

Characteristics	n	(%)
No depression (0–4)	972	(82.1)
Mild depression (5–9)	162	(13.7)
Moderate depression (10–14)	31	(2.6)
Moderate to severe depression (15–19)	13	(1.1)
Severe depression (20–27)	6	(0.5)
Present with depressive symptoms (PHQ 9 scores $\geq$ 5)	212	(17.9)

The scores of each item on the PHQ-9 scale > 1 (i.e., selections 2 and 3) were sorted, and the results show that item 4 appeared most frequently: feeling tired or having little energy (49 people in total, accounting for 4.1%). Item 3 ranked second (trouble falling asleep, staying asleep, or sleeping too much; 48 people, accounting for 4.1%). Items 1 and 7 were tied for third place: little interest or pleasure in doing things and trouble concentrating on things, such as reading the newspaper or watching television, accounting for 3.3% of the 39 participants. Item 9 was at the bottom of the list: thoughts that you would be better off dead or hurting yourself in some way, with 10 participants accounting for 0.84 percent. The core symptoms of items 1, 4, and 9 were endorsed in 69 cases, accounting for 5.8% of the cases.

3.3. Distribution of Various Self-Reported Factors in the Depressive and Non-Depressive Symptom Groups

All distributions of various self-reported factors in the participants are shown in Table 3. The working environment evaluation items consisted of 13 aspects independently reported by the survey respondents. A bad working environment was identified when any of these disadvantages were "always" or "often" present. A total of 368 respondents (31.1%) reported that their working environment was poor. The frequencies of various adverse environmental factors reported to be always or often present are listed in Table A1. The three most adverse environmental factors were noise (72, 6.1%), lack of sunlight (68, 5.7%), and humidity (58, 4.9%).

Table 3. Distribution of various self-reported factors in the participants with different depressive symptoms.

Variables		Depressive Symptoms		Non-Depressive Symptoms		Total	
		n	(%)	n	(%)	n	(%)
Working conditions							
Working position	Server	167	(18.7)	725	(81.3)	892	(75.3)
	Manager	45	(15.4)	247	(84.6)	292	(24.7)

Table 3. *Cont.*

Variables		Depressive Symptoms		Non-Depressive Symptoms		Total	
		n	(%)	n	(%)	n	(%)
Working conditions							
Working age	<5	149	(18.2)	671	(81.8)	820	(69.3)
	5–9.9	36	(17.5)	170	(82.5)	206	(17.4)
	≥10	27	(17.1)	131	(82.9)	158	(13.3)
Working hours per week	<40 h	43	(22.9)	145	(77.1)	188	(15.9)
	≥40 h	169	(17.0)	827	(83.0)	996	(84.1)
Working environment	Not bad	93	(11.4)	723	(88.6)	816	(68.9)
	Bad	119	(32.3)	249	(67.7)	368	(31.1)
Psychosocial factors							
Working ability	Week	6	(40.0)	9	(60.0)	15	(1.3)
	Average	91	(47.9)	99	(52.1)	190	(16.1)
	Strong	115	(11.8)	864	(88.3)	979	(82.7)
Working pressure	High	23	(47.9)	25	(52.1)	48	(4.1)
	Average	114	(33.7)	224	(66.3)	338	(28.6)
	Low	75	(9.4)	723	(90.6)	798	(67.4)
Interpersonal relationship	Poor	12	(85.7)	2	(14.3)	14	(1.2)
	Average	86	(43.0)	114	(57.0)	200	(16.9)
	Good	114	(11.8)	856	(88.3)	970	(81.9)
A fulfilling life	No	16	(88.9)	2	(11.1)	18	(1.5)
	Average	83	(48.8)	87	(51.2)	170	(14.4)
	Yes	113	(11.4)	883	(88.7)	996	(84.1)
Physical symptoms							
Ocular symptoms	Often	48	(68.6)	22	(31.4)	70	(5.9)
	Not	164	(14.7)	950	(85.3)	1114	(94.1)
Respiratory symptoms	Often	29	(70.7)	12	(29.3)	41	(3.5)
	Not	183	(16.0)	960	(84.0)	1143	(96.5)
Dermal symptoms	Often	19	(54.3)	16	(45.7)	35	(3.0)
	Not	193	(16.8)	956	(83.2)	1149	(97.0)
General symptoms	Often	106	(53.8)	91	(46.2)	197	(16.6)
	Not	106	(10.7)	881	(89.3)	987	(83.4)
Working performance							
Open the windows actively for ventilation when working	Often	168	(15.8)	893	(84.2)	1061	(89.6)
	Not	44	(35.8)	79	(64.2)	123	(10.4)
Be proactive in health knowledge training	Often	146	(14.7)	849	(85.3)	995	(84.0)
	Not	66	(34.9)	123	(65.1)	189	(16.0)
Concerned about the possible health effects from the place you work in	Often	142	(14.8)	816	(85.2)	958	(80.9)
	Not	70	(31.0)	156	(69.0)	226	(19.1)
Take the initiative to wear or use protective equipment at work	Often	97	(12.5)	678	(87.5)	775	(65.5)
	Not	115	(28.1)	294	(71.9)	409	(34.5)
Desire to learn more about health related to your workplace	Fully agree	159	(16.0)	837	(84.0)	996	(84.1)
	Not	53	(28.2)	135	(71.8)	188	(15.9)

Regarding physical symptoms, the detection rates of ocular, respiratory, dermal, and general symptoms were 5.9%, 3.5%, 3.0%, and 16.6%, respectively (Table 3). Among the four categories of symptoms, the detection rate of general symptoms was the highest (16.6%), and the top three specific symptoms were low back pain, fatigue, and lethargy (in Table A2).

3.4. Correlation between Depressive Symptoms and Various Factors

A correlation analysis was conducted between the depressive symptoms and various factors, including the sociodemographic characteristics, psychosocial factors, physical symptoms, working conditions, and working performance of the respondents. The results of the univariate analysis are shown in Table 4. The results of the multivariate analysis are presented in Table 5 (Model 1 was unadjusted for personal characteristics, while Model 2 was adjusted for sociodemographic characteristics).

Table 4. Univariate analysis between various factors and depressive symptoms.

Variables		Ref	OR (95%CI)	*p*
Sociodemographic characteristics				
Gender	Female	Male	0.8 (0.6–1.1)	0.176
Age	≥40	<40	**0.5 (0.4–0.7)**	**0.000**
BMI	<18.5 ≥24	18.5–23.9	**1.5 (1.0–2.4)** 1.3 (0.9–1.9)	**0.049** 0.136
Education	Graduate and above	Below university level	**1.9 (1.3–2.7)**	**0.000**
Income	5–9.9 ≥10	<5	0.9 (0.6–1.3) **0.6 (0.4–0.9)**	0.514 **0.024**
Smoking	Yes	No	1.3 (0.9–2.0)	0.189
Drinking	Yes	No	**2.2 (1.6–3.1)**	**0.000**
Working conditions				
Working position	Server	Manager	1.3 (0.9–1.8)	0.201
Working age	5–9.9 ≥10	<5	1.0 (0.6–1.4) 0.9 (0.6–1.5)	0.817 0.746
Working hours per week	≥40 h	<40 h	0.7 (0.5–1.0)	0.054
Working environment	Bad	Not	**3.7 (2.7–5.1)**	**0.000**
Psychosocial factors				
Working ability	Weak Strong	Average	0.7 (0.2–2.1) **0.1 (0.1–0.2)**	0.557 **0.000**
Working pressure	High Low	Average	1.8 (1.0–3.3) **0.2 (0.1–0.3)**	0.057 **0.000**
Interpersonal relationship	Poor Good	Average	**8. (1.7–36.5)** **0.2 (0.1–0.2)**	**0.008** **0.000**
A fulfilling life	No Yes	Average	**8.4 (1.9–37.6)** **0.1 (0.1–0.2)**	**0.005** **0.000**
Physical symptoms				
Ocular	Often	Not	**12.6 (7.4–21.5)**	**0.000**
Respiratory	Often	Not	**12.7 (6.4–25.3)**	**0.000**
Dermal	Often	Not	**5.9 (3.0–11.6)**	**0.000**
General	Often	Not	**9.7 (6.9–13.7)**	**0.000**
Working performance				
Open the windows actively for ventilation when working	Often	Not	**0.3 (0.2–0.5)**	**0.000**
Be proactive in health knowledge training	Often	Not	**0.3 (0.2–0.5)**	**0.000**

Table 4. *Cont.*

Variables		Ref	OR (95%CI)	*p*
Working performance				
Concerned about the possible health effects from the place you work in	Often	Not	**0.4 (0.3–0.5)**	**0.000**
Take the initiative to wear or use protective equipment at work	Often	Not	**0.4 (0.3–0.5)**	**0.000**
Desire to learn more about health related to your workplace	Fully agree	Not	**0.5 (0.3–0.7)**	**0.000**

Note: Values are expressed as crude odds ratio (95% CI). The bolded values indicate the statistically significant association between the variables.

Table 5. Multivariate analysis between various factors and depressive symptoms.

	Model 1		Model 2	
	OR (95% CI)	*p*	OR (95% CI)	*p*
Working conditions				
Working environment (ref = not bad)	1.7 (1.1–2.5)	**0.010**	1.7 (1.1–2.5)	**0.008**
Psychosocial factors				
Working ability (ref = average)				
Weak	0.1 (0.0–1.0)	0.056	0.1 (0.0–1.0)	**0.050**
Strong	0.4 (0.2–0.7)	**0.001**	0.4 (0.3–0.8)	**0.002**
Interpersonal relationship (ref = average)				
Poor	14.8 (1.4–151.4)	**0.023**	14.4 (1.4–1509)	**0.026**
Good	0.8 (0.4–1.3)	0.310	0.7 (0.4–1.2)	0.220
A fulfilling life (ref = average)				
No	8.7 (1.2–62.7)	**0.031**	9.6 (1.3–71.2)	**0.026**
Yes	0.5 (0.3–0.8)	**0.008**	0.5 (0.3–0.9)	**0.021**
Physiological symptoms				
Ocular (ref = not often)	4.6 (2.4–9.0)	**0.000**	4.0 (2.0–8.0)	**0.000**
general (ref = not often)	4.2 (2.8–6.4)	**0.000**	4.8 (3.1–7.3)	**0.000**
Performance				
Taking the initiative to wear or use protective equipment at work (ref = not often)	0.6 (0.4–0.9)	**0.020**	0.7 (0.5–1.0)	**0.033**

Note: Values are expressed as an adjusted odds ratio (95% CI). Model 1: Working conditions, psychosocial factors, symptoms, and performance ($p < 0.05$) in univariate analyses were included in multivariate stepwise logistic regression analysis (forward LR). Model 2: Model 1 was adjusted for sociodemographic characteristics The bolded values indicate the significant association between the variables.

Univariate analysis results (Table 4) showed that age $\geq$ 40 years, an annual income of more than CNY 100,000, strong working ability, low working pressure, good interpersonal relationships, a fulfilling life, often opening the windows actively for ventilation when working, being often proactive in health knowledge training, being concerned often about the possible health effects from the place of work, taking the initiative often to wear or use protective equipment at work, and desiring to learn more about health related to the workplace were associated with a lower risk of depressive symptoms, i.e., having a PHQ-9 score higher than 5 (OR < 1, $p < 0.05$). In contrast, a BMI < 18.5, being a university graduate and above, drinking, a poor working environment, poor interpersonal relations,

an unfulfilling life, and the presence of discomfort always or often in various systems (ocular, respiratory, dermal, or general symptoms) were associated with a higher risk of depressive symptoms (OR > 1, $p > 0.05$).

The results of the multivariate analysis (Table 5) showed that, in terms of working conditions, a bad working environment was associated with a higher risk of depressive symptoms (OR = 1.7, 95%CI: 1.1–2.5). With regard to psychosocial factors, poor interpersonal relationships (OR = 14.4, 95%CI: 1.4–150.9) and an unfulfilling life (OR = 9.6, 95%CI: 1.3–71.2) were associated with a risk of depressive symptoms (OR > 1, $p < 0.05$). In terms of physiological symptoms, ocular (OR = 4.0, 95%CI: 2.0–8.0) and general (OR= 4.8, 95%CI: 3.1–7.3) symptoms with frequent or constant discomfort were associated with a higher risk of depressive symptoms (OR > 1, $p < 0.05$). Conversely, strong working ability (OR = 0.4, 95%CI: 0.3–0.8), a fulfilling life (OR = 0.5, 95%CI: 0.3–0.9), and taking the initiative to wear or use protective equipment at work (OR = 0.7, 95%CI: 0.5–1.0) were associated with a reduced risk of depressive symptoms (OR < 1, $p < 0.05$). The results were similar before (Model 1) and after (Model 2) adjusting for sociodemographic characteristics.

4. Discussion

4.1. Distribution of Sociodemographic Characteristics of Employees in Public Utility Places

In this study, most participants were female (65.3%) with a working experience of less than five years. This is consistent with the situation reported in recent years, where the proportion of female employees in public utility places is relatively high and personnel mobility is large [31]. With the rapid development of society, the age structure and educational level of employees working in public utility places have also changed. They are becoming younger and more educated [32]. These all suggest that the pertinence and effectiveness of health interventions in the future will face new requirements and challenges, since they must match the changes in population characteristics. So, it is a continuous process to strengthen the monitoring of and interventions for physical and mental health for the rapidly changing characteristics of public employees.

Most respondents in this research were engaged in frontline work and were primarily service employees (75.3%). Many frontline posts in public utility places do not require very high professional skills. They need more work time rather than complicated skills. So, it is not difficult to understand the relatively higher percentage (84.1%) of employees who worked more than 40 h. Long work does not mean a higher income; more than half of the people (63.9%) earned less than 100,000 CNY/year, and the percentage of employee turnover within 5 years was as high as 69.3. In summary, working in a public utility place may have a screening function for employees. Longer working hours and lower income contributed to depression more in the vulnerable population included under the screening of job requirements. No sex differences in depressive symptoms were observed in this study, which may also have been due to occupational screening.

The association between age, income, education, and depressive symptoms in the results may be due to the following factors: with the increase in age, the economic situation and supportive social resources may become better and better. So, the risk of depressive symptoms decreases. Generally speaking, people with higher education levels have higher career expectations. The realization of self-worth in the service industry may have a greater conflict between ideal and reality, which increases the risk of depressive symptoms. However, a high education level sometimes has a protective effect on depressive symptoms, especially when the job has high competency requirements [33]. So, the interference caused by the screening function of job requirements should be taken into account in the analysis of the results. Different from the psychological mechanisms conjectured by the above three factors, the increased risk of depressive symptoms induced by low BMI and alcohol consumption may be due to the impairment of physiological (immune) function. However, the opposite hypothesis is also probable, and low BMI and alcohol consumption may be a by-product of depressive symptoms [34,35]. This study cannot establish causality.

4.2. Current Status of Depressive Symptoms and the Observed Factors in Public Utility Place Employees

The survey results showed that the prevalence of depressive symptoms among employees in Zhejiang Province's public utility places was 17.9%, which was similar to the results among the Chinese labour force in 2016 (17.3%) and in-service employees in 2018 (19.3%) studied by Guoying Zhang [26]. Although the prevalence of depressive symptoms among employees of public utility places is lower compared with the elderly and the high-stress occupational groups (44.1–55.2%) [36,37], nearly 20% is still a shocking proportion because these people are the main labour force in society and the spiritual and economic support of a family, and they should be very healthy.

As for physical health, the detection rate of specific physical symptoms was relatively low for the ocular (5.9%), respiratory (3.5%), and dermal systems (3.0%) but not for general symptoms (16.6%). The top three general symptoms were low back pain, fatigue, and lethargy, which is not only consistent with the research reports of other scholars [6,38,39] but also somewhat coincident with the top three symptoms of depression obtained from this survey: Q4, feeling tired or having little energy; Q3, trouble falling asleep, staying asleep, or sleeping too much; and Q1, little interest or pleasure in doing things. Fatigue and lethargy are two original symptoms of the DSM-V diagnostic criteria for depression, but pain attracts our attention. Lumbago and back pain were common symptoms that many people have experienced, but they were easily neglected. However, with the expansion of studies on the relationship between pain and depression, pain, especially persistent chronic pain, has received increasing attention [40,41]. Although it was difficult to conclude that the general symptoms in the survey were not the manifestations of depressive symptoms, this study still suggests that persistent discomfort without an obvious trigger, such as fatigue, lethargy, and pain, is likely an early sign of depression. The self-perception of the working environment reports showed that nearly one-third of the respondents rated their work environment as poor, with at least one reporting confusing environmental distraction to be always or often present. Except an evaluation of the relationship between the overall environmental perception and depressive symptoms, we did not analyse the relationship between the subitems in this study. However, the sorting of uncomfortable environmental factors still showed some interesting information. Noise, lack of sunlight, and environmental humidity were the top three adverse environmental factors, similar to the situation reported by other scholars [6,8,16]. Noise is defined as an undesirable sound. Both the absolute level of sound and personal perception of noise can have various health consequences [42,43]. They not only induce hearing impairment but are also related to non-auditory effects, including mental health, particularly depressive symptoms. As reported, transportation noise level and noise annoyance may jointly and independently influence the risk of depression [44]. According to this result, noise in public utility places may also be inextricably related to depression, probably acting via annoyance, which needs to be further explored in the future. In addition, our results also add to the evidence that a lack of light and humidity are associated with depressive symptoms. This conclusion has been confirmed by some reports [45,46]. Overall, the traditional adverse working environment factors, such as noise, lack of sunlight, and humidity, are still widespread and damaging to human health. It is just that we now need to gradually shift our focus from their physical effects to their mental effects.

4.3. Thinking of Interventions for Depressive Symptoms of Employees in Public Utility Places

An analysis of the association between the study factors and depressive symptoms showed that the perception of a bad work environment, poor interpersonal relationships, an unfulfilling life, and frequent physical symptoms were associated with a higher risk of depressive symptoms. Strong work ability, fulfilment in life, and active work performance were associated with a lower risk of depressive symptoms. These results are consistent with the findings of other reports [30,33]. They can offer great guidance for carrying out depressive symptom interventions in public utility places. Firstly, we need to improve the

working environment, such as reducing noise, keeping the air dry, and so on. Secondly, we should also create an inclusive working atmosphere to enhance employee self-efficacy and social support by establishing employee fellowship and offering EAP services. These may be effective intervention measures to reduce the prevalence of depressive symptoms among employees working in public utility places. However, because this was a cross-sectional study, the causal relationship between any factors cannot be deduced. For example, it was difficult to identify whether the physical discomfort and positive health behaviours of the participants in this study were the cause or result of depressive symptoms, but all factors could certainly influence each other. That means the better the physical and mental health of employees in the workplace, the better the completion and performance of work, and the better the service experience and health security in public utility places. A World Health Organization (WHO) report shows that for every USD 1 invested by employers in treating depression and anxiety, USD 4 are returned, suggesting that early identification of and interventions for depressive symptoms can be cost-effective measures [47]. Although mental health promotion and prevention programs have increased globally, only 7% of such initiatives are workplace-based [48]. Our findings provide vital guidance for the monitoring of and interventions for depressive symptoms in public utility places.

4.4. The Limitations of This Study

We have to acknowledge some limitations in this study. The first is that the inclusion criteria of the respondents were not rigorous enough to exclude people who had experienced major life events such as bereavement in the past half a year, which have a serious impact on depressive symptoms. Even though we mainly focused on exploring the correlation between occupational place factors and depressive symptoms, the design of the variables was still not sufficiently comprehensive, and only parts of work-related sociopsychological factors were included. It has been reported that, compared with social and psychological factors, the effect of physical and chemical factors on depression is relatively small; however, they still need to be supplemented in future research. Secondly, because the study used a cross-sectional design, conclusions about statistical associations may not be causal, and reverse causation cannot be ruled out. It was unclear whether passive environmental factors led to depressive symptoms or whether employees with depressive symptoms were more sensitive to perceived passive environmental factors than healthy workers. Thirdly, Zhejiang Province is a province in China with a small gap between the rich and poor; therefore, the participants in this study were only recruited from four cities from the south to the north. However, not all types of public utility places were included. The generalizability of the results may be limited by the representativeness of the participants. In the future, we can consider expanding the area and population range of the respondents for further research. Finally, as both exposures and outcomes were based on self-reports, there may have been reporting bias that led to inflated associations because of common method variance. Strict inclusion and exclusion criteria, cohort studies, increasing objective and comprehensive indicators, including standardized clinical interviews or feedback from others, and using more innovative statistic methods for data analysis and mining are expected to improve the limitations of this study. They could be utilized in future studies.

5. Conclusions

Based on the results of this study, the prevalence of depressive symptoms among employees in public utility places in Zhejiang Province was 17.9%. Perceptions of a poor work environment, poor interpersonal relationships, an unfulfilling life, and frequent ocular and general uncomfortable symptoms were associated with a higher risk of depressive symptoms. Strong work ability, fulfilment in life, and taking the initiative to wear or use protective equipment at work were associated with a lower risk of depressive symptoms. The results of this study provide some related markers for the scientific surveillance of and interventions for depressive symptoms in employees of public utility places in Zhejiang

Province. It suggested that we should create a friendly working environment and amicable interpersonal relationships to protect employees from depressive symptoms and improve working performance. Given the limitations of this study, there are uncertainties in the extrapolation of the conclusions. Cohort studies may be a better approach.

Author Contributions: Conceptualization, M.X.; methodology, L.W. and X.L.; formal analysis, X.W., Z.C. and P.T.; investigation, M.X., L.W., X.L. and P.T.; data curation, M.X., L.W. and X.L.; writing—original draft preparation, L.W., X.L. and M.X.; writing—review and editing, L.W., P.T. and M.X.; supervision, X.W., Z.C. and M.X.; project administration, X.W. and Z.C. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Zhejiang Provincial Project for Medical Research and Health Sciences (grant numbers 2021PY042 and 2020KY515).

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethical Review Committee of the National Institute of Environmental Health, Chinese Center for Disease Control and Prevention (approval no. 201821).

Informed Consent Statement: Written informed consent was obtained from all participants during the study period. Participants were allowed to withdraw from the study at any time.

Data Availability Statement: The datasets supporting the conclusions of this article are available from the corresponding author upon reasonable request.

Acknowledgments: The authors would like to thank the CDC staff from Huzhou, Jiaxing, Shaoxing, and Wenzhou who conducted the field investigations at the county level. The authors also thank all the participants of this study.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Distribution of frequency occurrence of each item in PHQ-9 scale in the participants.

Characteristics	N (%)
Q4 Feeling tired or having little energy	49 (4.1)
Q3 Trouble falling asleep, staying asleep, or sleeping too much	48 (4.1)
Q1 Little interest or pleasure in doing things	39 (3.39)
Q7 Trouble concentrating on things, such as reading the newspaper or watching television	39 (3.3)
Q6 Feeling bad about yourself or that you are a failure, or have let yourself or your family down	37 (3.1)
Q5 Poor appetite or overeating	32 (2.7)
Q2 Feeling down, depressed, or hopeless	25 (2.1)
Q8 Moving or speaking so slowly that other people could have noticed. Or, the opposite, being so fidgety or restless that you have been moving around a lot more than usual	20 (1.7)
Q9 Thoughts that you would be better off dead or hurting yourself in some way	10 (0.8)
Any one of Q1 or Q4 or Q9	69 (5.8)

Table A2. Frequency of reports of various environmental adverse factors that were always or often present.

Characteristics	N (%)
E1 Noise	72 (6.1)
E11 Lack of sunlight	68 (5.7)
E3 Humidity	58 (4.9)
E2 Dryness	54 (4.6)
E12 Disinfectant odour	49 (4.1)
E13 Poor ventilation	49 (4.1)
E5 Pungent smell	31 (2.6)
E4 Temperature perturbation	29 (2.5)
E10 Dusty air	27 (2.3)

Table A2. *Cont.*

Characteristics	N (%)
E9 The four pests	26 (2.2)
E6 Musty smell	16 (1.4)
E7 Smelly tap water	16 (1.4)
E8 Unclean sanitation facilities	12 (1.0)

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