International Journal of Biology and Life Sciences
ISSN: 2957-9511 | Vol. 6, No. 2, 2024

Epidemiological Investigation of Chronic Cough in Chongqing

Jian He, Zhijiao Jiang, Feng Xu, Xuemei Zhang, Changchun Yin, Yongxiu Yao, Jing Huang *

Department of respiratory and critical care medicine, Chongqing General Hospital, Chongqing University, Chongqing, 400014, China
*** Corresponding author:** Jing Huang (Email: 25628842@qq.com)

Abstract: Objective to investigate the incidence and risk factors of chronic cough in Chongqing urban residents aged 18-80 years. Methods a questionnaire was designed, and the incidence and related data of chronic cough among residents aged 18-80 years in Chongqing urban area were statistically analyzed in the form of community field questionnaire. Results a total of 1851 questionnaires were used, of which 1804 were valid. The total incidence of chronic cough was 11.64%, Before the prevalence of covid-19, it was 10.65%, The prevalence of covid-19 was 12.14%. Multivariate analysis of chronic cough showed that the patients were 50 years old or older (or=2.063, 95% CI 1.476-2.883, P<0.05), P<0.05), Senior high school and below (or=0.601, 95% CI 0.430-0.840, P<0.05), 497, 95% CI 1. 784-3. 494, P<0.05), Smoking (or=2.055, 95% CI 1.465-2.882, P<0.05), P<0.05), Drinking (or=2.415, 95% CI 1.692-3.446, P<0.05), P<0.05), Infection with covid-19 (or=1.902, 95% CI 1.387-2.608, P<0.05), P<0.05) the incidence of chronic cough in residents was significantly increased. Multivariate analysis of the severity of chronic cough showed that the risk of severe chronic cough in patients aged 50 years and over was 3.584 times higher than that in patients aged less than 50 years (or=3.584, 95% CI 1.304-9.846, P<0.05), P<0.05), Secondly, the influence of season on cough severity was also statistically significant (or=3.689, 95% CI 1.233-11.038, P<0.05), P<0.05). Multiple correspondence analysis (MCA) of chronic cough related factors showed that the severity of cough was moderately correlated with the impact on life and mood. Conclusion the incidence of chronic cough during the epidemic period of new coronavirus is increased. The incidence of chronic cough is higher in residents aged 50 and above, with lower education (high school and below), smoking and drinking, complicated with chronic respiratory diseases, and infected with covid-19. Chronic cough in patients aged 50 years and above is more serious, and chronic cough significantly affects the daily life and mood of residents. It is necessary to pay attention to the chronic cough group and get timely and effective diagnosis and treatment.

Keywords: Chongqing Area; Chronic Cough; Covid-19 Infection; Epidemiology.

1. Introduction

Chronic cough is a group of common diseases in respiratory medicine, which is seriously harmful to human health, accounting for more than one third of the outpatient department of respiratory medicine[1]. The etiology of chronic cough is complex. In a broad sense, chronic cough includes patients with abnormal imaging. Due to difficult diagnosis, nonstandard treatment and uncertainty, chronic cough may cause potential physical and mental damage in addition to seriously affecting life and work, and some diseases will eventually cause serious respiratory insufficiency. In recent years, during the epidemic period of new coronavirus (covid-19), 20% -30% of patients still have cough after 2-3 months of virus infection, and even 2.5% of patients still have cough symptoms after 1 year of infection[2]. The research results of chronic cough in different time and regions have great differences. This study will investigate the epidemiological characteristics and risk factors of chronic cough before and after the prevalence of neocoronavirus in Chongqing, in order to guide the health education and standardized diagnosis and treatment of chronic cough.

2. Object and Method

2.1. Research Object

In this paper, we selected five communities in Chongqing and investigated 1851 residents from September 1, 2022 to May 15, 2023. All respondents have lived in the city for 2 years or more. This study was approved by the medical ethics committee of the college.

2.2. Research Methods

The star questionnaire was designed with reference to the chronic cough impact questionnaire CCIQ[3], including gender, age, education, occupation, height, weight, smoking, drinking, infection with covid-19, cough greater than 8 weeks, cough frequency, cough severity (VAS), seasonal distribution, mood changes, complications of respiratory chronic diseases, chest X-ray and chest CT examination. This paper adopts the method of random survey in community.

2.3. Definition of Chronic Cough

According to the standard definition of "guidelines for the diagnosis and treatment of cough (2021)", a cough lasting for four weeks or more within a year is diagnosed as chronic cough.

2.4. Statistical Methods

The standardized electronic database was established by Excel software, and the data were statistically analyzed by SPSS 26.0 statistical software. The counting data were expressed by frequency and proportion, the rate was compared by chi square test, and the risk factors were analyzed by multivariate logistic regression. Multiple correspondence analysis (MCA) was used to analyze the correlation of influencing factors of chronic cough. In all statistical results, $p<0.05$ was considered as statistically

significant difference.

3. Results

3.1. General Demographic Information

A total of 1851 questionnaires were used, including 1804 valid questionnaires, 601 questionnaires from September 1, 2022 to October 30, 2022 (before covid-19 epidemic), and 1203 questionnaires from March 15, 2023 to May 15, 2023 (after covid-19 epidemic), including 783 males and 1021 females.

3.2. Incidence of Chronic Cough

The total incidence of chronic cough was 11.64%, before the prevalence of covid-19 was 10.65%, after the prevalence of covid-19 was 12.14%. The incidence of chronic cough was 16.09% (126/783) in males and 8.23% (84/1021) in females. 60% of patients with chronic cough underwent chest X-ray or CT examination, and only 36.6% of them were older than 50 years old.

3.3. Analysis of Risk Factors for Chronic Cough

The risk factors of chronic cough were compared between chronic cough group (210 cases) and non chronic cough group (1594 cases). Univariate analysis and multivariate analysis showed that the incidence of chronic cough was correlated with age 50 and above, high school education and below, chronic respiratory disease, smoking, drinking, covid-19 infection (P<0.05). However, gender, body mass index and occupation were not significantly associated with the incidence of chronic cough (Tables 1 and 2).

Table 1. Single factor analysis of risk factors for chronic cough among residents in Chongqing

factor	Chronic cough (n)	Number of cases (n)	%	X^2	P
Gender					
masculine	126	783	16.09	26.649	0.000
woman	84	1021	8.23		
Age group (years)					
< 50	83	1096	7.57	44.926	0.000
≥ 50	127	708	17.94		
Education Group					
High school and below	135	829	16.28	32.160	0.000
Junior college or above	75	975	9.43		
occupation					
Student, unemployed, retired	80	691	11.58		
Individuals, institutions and professional technicians	39	351	11.11	10.721	0.013
Farmers, workers, carpenters, painters or quarrymen	64	416	15.38		
other	27	346	7.80		
Complicated with chronic respiratory diseases					
yes	71	338	21.01	35.466	0.000
no	139	1466	9.48		
body mass index					
BMI≤18.4	22	173	12.72		
18.4 < BMI ≤ 23.9	122	1095	11.14	0.751	0.861
23.9 < BMI ≤ 27.9	52	428	12.15		
> 27.9	14	108	12.96		
Smoking (including the past)					
yes	104	468	22.22	68.791	0.000
no	106	1336	7.93		
Drinking or not					
yes	89	422	21.09	47.819	0.000
no	121	1382	8.76		
Whether infected with new crown					
yes	136	972	13.99	17.530	0.000
no	74	832	8.89		

Table 2. Logistic regression analysis of risk factors for chronic cough in Chongqing residents

factor	regression coefficient	Wald X^2	P	OR	95% CI	
					lower limit	limit
Age	0.741	18.370	0.000	2.098	1.495	2.944
educational background	-0.484	7.851	0.005	0.616	.439	.865
Complicated with chronic respiratory diseases	0.915	28.481	0.000	2.497	1.784	3.494
Smoking or not	0.687	15.239	0.000	1.987	1.408	2.804
Drinking or not	0.868	22.003	0.000	2.383	1.658	3.425
Whether infected with new crown	0.700	18.222	0.000	2.013	1.460	2.776

3.4. Analysis of Risk Factors for the Severity of Chronic Cough

The severity of chronic cough was assessed by VAS score [4]. Patients with a score of 5 or more were included in the chronic cough group. Patients with a score of 5-7 were defined as mild chronic cough, and patients with a score of 8-10 were defined as severe chronic cough. Univariate and multivariate analysis of risk factors in the two groups showed that age had a statistically significant impact on the severity of cough. The risk of severe chronic cough in patients aged 50 years and over was 3.584 times higher than that in patients aged 50 years (or=3.584, 95% CI 1.304-9.846, p<0.05), and the influence of season on the severity of cough was also statistically significant (or=3.689, 95% CI 1.233-11.038, P<0.05).05). Winter is the season with higher cough severity.

Gender, occupation, body mass index, smoking, alcohol consumption, respiratory disease and covid-19 infection had no significant effect on cough severity (tables 3 and 4).

Table 3. Single factor analysis of risk factors for chronic cough severity in Chongqing residents

factor	Mild chronic cough (n=173)	Severe chronic cough (n=37)	X^2	P
Gender				
Male (%)	99 (57.2)	27 (73.0)	3.150	0.076
Female (%)	74 (42.8)	10 (27.0)		
Age (years)				
< 50 (%)	74 (42.8)	9 (24.3)	4.341	0.037
≥ 50 (%)	99 (57.2)	28 (75.7)		
Education Group				
High school and below (%)	109 (63.0)	26 (70.3)	0.701	0.403
Junior college or above (%)	64 (37.0)	11 (29.7)		
Body mass index				
BMI ≤ 18.4 (%)	20 (11.6)	2 (5.4)		
18.4 < BMI ≤ 23.9 (%)	99 (57.2)	23 (62.2)	2.736	0.434
23.9 < BMI ≤ 27.9 (%)	41 (23.7)	11 (29.7)		
> 27.9 (%)	13 (7.5)	1 (2.7)		
Smoking (including the past)				
Yes (%)	84 (48.6)	20 (54.1)	0.369	0.544
No (%)	89 (51.4)	17 (45.9)		
Drinking or not				
Yes (%)	69 (39.9)	20 (54.1)	2.506	0.113
No (%)	104 (60.1)	17 (45.9)		
Is there any chronic disease				
Yes (%)	67 (38.7)	25 (67.6)	9.040	0.003
No (%)	106 (61.7)	12 (32.4)		
Is cough related to season				
Yes (%)	28 (16.2)	14 (37.8)	8.932	0.003
No (%)	145 (83.8)	23 (62.2)		
Have you ever had covid-19 infection				
Yes (%)	110 (63.6)	22 (59.5)	0.222	0.637
No (%)	63 (36.4)	15 (40.5)		

Table 4. Logistic regression analysis on risk factors of chronic cough severity in Chongqing residents

factor	regression coefficient	Wald X^2	P	OR	95% CI	
					lower limit	limit
Age	1.276	6.128	0.013	3.584	1.304	9.846
Complicated with respiratory diseases	0.153	.087	0.768	1.166	0.421	3.231
season	1.305	5.450	0.020	3.689	1.233	11.038

3.5. Correlation Study between Chronic Cough Related Factors

Through multiple correspondence analysis (MCA) among chronic cough related factors, it was found that gender (male) was strongly correlated with drinking and smoking (correlation coefficient was 0.673, 0.543, respectively); The severity of chronic cough was moderately correlated with whether it affected mood (correlation coefficient was 0.322); The severity of chronic cough was weakly correlated with age, gender, whether there were chronic respiratory diseases, season, etc.

4. Discussion

The incidence of chronic cough is very high. It is estimated that the overall prevalence in adults worldwide is about 10%, and the incidence in the elderly can reach 10% - 15%. The symptoms can last for months to years[5]. The causes of chronic cough are complex and the influencing factors are diverse. The incidence of small airway disease in adults in China is as high as more than 50%, with about 426million people[6]In the early stage of chronic cough, there were more small airway lesions. Therefore, the investigation of the epidemiology and risk factors of chronic cough is helpful to improve the level of diagnosis and treatment of chronic cough, and to intervene the further lesions of small airways.

There are great differences in the incidence of chronic cough in different regions at different times. Since the neocoronavirus pandemic in 2020, cough has become one of its main symptoms, Woo Jung song et al analyzed 14 studies of hospitalized patients in many countries, and the follow-up time ranged from 6 weeks to 4 months, The prevalence of chronic cough after covid-19 infection was 18%[7]. We conducted an epidemiological survey of chronic cough in the urban area of Chongqing, and found that the total incidence of chronic cough was 11.64%, 10.65% before the epidemic of covid-19 and 12.14% after the epidemic of covid-19, which was slightly increased. In multivariate analysis, infection with covid-19 was significantly associated with the incidence of chronic cough.

The single factor analysis of the epidemiological survey data showed that male gender, 50 years old and above, high school education and below, combined with chronic respiratory diseases, smoking, drinking, and occupations with dust exposure risk were associated with the incidence of chronic cough. The multivariate analysis of the above factors suggested that gender, occupation and the incidence of chronic cough had no statistical significance. A global multicenter study on the epidemiology of chronic cough showed that the proportion of women in Europe and the United States was significantly higher than that of men[8]There are also domestic studies that have found that the prevalence rate of women is significantly higher than that of men, suggesting that women are more sensitive to cough[9]According to the research of Chinese Lai kefang

team, the male to female ratio of patients with chronic cough is close[10], which is consistent with the findings of this survey. The survey population is urban population, and few people are directly exposed to dust and chemical materials. We included workers, farmers and other workers in the occupations with dust exposure risk, which may lead to the results of multiple factors that are not significant. Although gender and occupation have no significant impact on the incidence of chronic cough in this survey, chronic cough is significantly increased in people who smoke and drink alcohol. Many domestic studies believe that smoking is an independent risk factor for chronic cough[11].

This survey found that patients with chronic cough received chest imaging examination accounted for 60%, of which patients with chronic cough older than 50 years old accounted for only 36.6%, and the risk of severe chronic cough in patients older than 50 years old was 3.584 times that in patients younger than 50 years old, indicating that the symptoms of middle-aged and elderly patients with chronic cough were more serious, but they lacked the awareness of medical treatment. In the correlation study, it was found that the severity of chronic cough was moderately correlated with mood. Although there was no large-scale independent investigation on the quality of life of patients with chronic cough in China, some domestic and foreign studies suggested that chronic cough could cause negative effects on the quality of life such as urinary incontinence and social isolation[11, 12], because covid-19 is still prevalent, and cough is one of the most common symptoms of covid-19, the fear of cough is widespread in the community. In the context of covid-19 pandemic, we should pay more attention to the standard diagnosis and treatment of chronic cough patients, especially middle-aged and elderly patients, and the impact on the quality of life.

Acknowledgments

Fund support: Study on meteorological environment inducement and prediction technology of airway inflammation and lung function changes in patients with chronic cough in Chengdu and Chongqing (2022YFQ0001).

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