

# Prevalence and Risk Factors of Anxiety Among Adult Patients with Chronic Pharyngitis in Wuhu, China

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**Objective:** Chronic pharyngitis (CP) is a common disease, which has a long duration and a wide range of onset. Anxiety is considered to be a common complication in patients with CP. The purpose of this study was to evaluate the anxiety level and potentially influencing factors in patients with CP, to provide insights for the management of anxiety in patients with CP.

**Methods:** A total of 104 adult patients with CP meeting the inclusion/exclusion criteria were enrolled from a single center in Wuhu, China between October 2015 and December 2016. A Self-rating Anxiety Scale (SAS) was used to measure the status of anxiety. The relationship between SAS scores and illness period in patients with CP was analyzed by Pearson correlation test. Univariate analysis and binary logistic regression analysis were performed to analyze the risk factors of anxiety in patients with CP.

**Results:** The average SAS score of 104 patients with CP was ( $44.17 \pm 8.38$ ), including 82 cases (78.85%) without anxiety and 22 cases (21.15%) with anxiety. Moreover, the illness period was found to be positively related to SAS scores in patients with CP ( $r = 0.378$ ,  $P = 0.001$ ). Furthermore, the results of univariate analysis showed that there were significant differences in anxiety state among CP patients with different age, illness period, source of treatment payment, and marital status ( $P < 0.05$ ). Additionally, the results of binary logistic regression analysis showed that age, source of treatment payment, and marital status were the independent risk factors affecting the anxiety status of patients with CP ( $P < 0.05$ ).

**Conclusion:** These results suggested that CP patients with advanced age, self-pay, and unmarried status had higher risk for anxiety.

**Keywords:** chronic pharyngitis, risk factor, self-rating anxiety scale, anxiety, prevalence

## Introduction

Chronic pharyngitis (CP) is a frequent pharyngeal mucosa inflammation that causes serious issues in everyday living, ranging from morning throat soreness to voice changes.<sup>1,2</sup> The etiology of CP is complex. The most important cause is bacterial infection, which is followed by non-infectious causes such as occupational exposure, obstructive sleep apnea and hypopnea syndrome.<sup>3</sup> It has been reported that the number of outpatient visits for CP in the United States ranges from 7,000,000 to 11,000,000.<sup>4,5</sup> In China, it has been suggested that the prevalence of CP may be high due to the severe air pollution.<sup>6</sup> Because of the large population and enormous burden, CP is increasingly recognized as a global public health issue.

Anxiety, a psychological and physiological condition characterized by strong feelings of worry, unease, or fear that interfere with work and daily life, is the most common mental health problem worldwide.<sup>7</sup> Due to the long course of CP, difficulty in self healing, complex etiology, multiple complications, and high treatment costs, as well as family and social factors, physical and psychological disorders including anxiety, are common among patients with CP, seriously affecting

their quality of life. Besides, anxiety can impede the confidence of CP patients to self-manage, leading to non-adherence with treatment.<sup>8</sup> Therefore, it is of great clinical significance to evaluate the anxiety level and potentially influencing factors in patients with CP, with the aim to provide insights for the management of anxiety of CP patients.

Currently, the prevalence and risk factors of anxiety in adult patients with CP in China remain unclear. In the present study, in order to evaluate the anxiety level and potentially influencing factors in adult patients with CP in China, we performed a study to determine the anxiety status in adult patients with CP from a single center in Wuhu, China, and analyze the related impact factors, providing helpful information for medical staff to identify high-risk CP patients for anxiety before commencement of clinical evaluation.

## Materials and Methods

### Study Design and Participants

A total of 104 adult patients with CP meeting the inclusion/exclusion criteria were enrolled from Yijishan Hospital of Wannan Medical College in Wuhu, China between October 2015 and December 2016. Patients diagnosed with CP based on the diagnostic criteria of chronic simple pharyngitis (CSP) and chronic hypertrophic pharyngitis (CHP) in the Practice of Otolaryngology-Head and Neck Surgery (2nd edition) by an experienced researcher were enrolled in the present study. Common criteria for patient inclusion were as follows: (1) being between the ages of 18–65; (2) meeting diagnostic criteria of CP; (3) No obvious bacterial formation is found in the general bacterial culture in the laboratory. Common criteria for patient exclusion were as follows: (1) Major psychiatric disorders or neurodegenerative illness history; (2) Allergic diseases: allergic rhinitis and allergic pharyngitis; (3) Patients unable or unwilling to cooperate with the study. This procedure was approved by the ethics committee of Yijishan Hospital of Wannan Medical College and was conducted according to the principles of the Declaration of Helsinki. Informed consent was obtained from all the participants.

### Measurement of Anxiety Status

The SAS scale was compiled by Zung, which is widely used in clinical and medical research as a norm-referenced scale to assess anxiety symptoms for the past few decades.<sup>9</sup> There are 20 items in total, with 1–4 points for each item and 15 forward scores and 5 reverse scores, respectively. The rough score is the sum of the scores of the 20 items.<sup>10</sup> SAS scores ranging from 50 to 59 were diagnosed as mild anxiety, those from 60 to 69 as moderate anxiety, and  $\geq 70$  as severe anxiety according to the Chinese norm. SAS scale has been translated into Chinese versions, with a high reliability coefficient for different populations in China. The Cronbach  $\alpha$  coefficient of the scale is 0.82.<sup>11,12</sup>

### Data Collection

Face-to-face interviews of participants were conducted using a structured questionnaire with detailed information on demographic and sociological information of the patient, including the patient's age, gender, illness period, level of education, work status, monthly income, source of treatment payment, marital status, residence, history of smoking, and history of drinking.

### Statistical Analysis

Sample size was determined based on the expression  $N = Z^2(1 - p)(p)/b^2$ ,<sup>13</sup> where  $N$  is the minimum sample size,  $z$  is the standard normal deviation, usually set at 1.96 which corresponds to the 95% confidence interval,  $p$  is the proportion (7.5%) in the target population estimated to have anxiety according to a pre-investigation, and  $b$  is the degree of accuracy desired, usually set at 5%. Consequently, a sample size of 100 was calculated.

Statistical analysis was calculated using SPSS (version 17.0; IBM Corp., Armonk, NY, USA). The statistical significance was set at  $P < 0.05$ . The normality of the distribution of continuous variables was analyzed using the one-sample Kolmogorov–Smirnov test. The continuous values were presented as mean and standard deviation (SD), and  $t$  tests or ANOVA tests were performed for data comparison. Chi-square tests were used for categorical data. Pearson's correlation test was used for correlation analyses. Binary logistic regression analysis was conducted to identify the potential risk factors for anxiety in patients with CP.

## Results

### Assessment Results of SAS in 104 Patients with CP

The average SAS score of 104 patients with CP was ( $44.17 \pm 8.38$ ), including 82 cases (78.85%) without anxiety and 22 cases (21.15%) with anxiety.

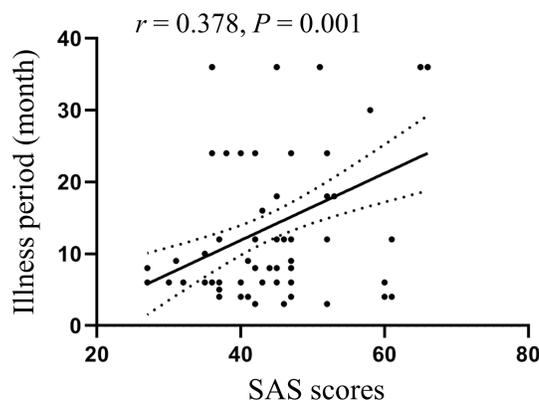
### Univariate Analysis of the Influencing Factors of Anxiety in Patients with CP

Univariate analysis of the differences in anxiety across variables are shown in Table 1. There were significant differences in anxiety state among CP patients with different ages, illness period, source of treatment payment, and marital status ( $P < 0.05$ ). However, there was no statistical significance in anxiety of patients with CP with different gender, level of education, work status, monthly income, residence, history of smoking or history of drinking ( $P > 0.05$ ).

**Table 1** Univariate Analysis of Anxiety in Patients with CP

Items	Cases (%)	SAS Scores	t/F	P
Age			-3.477	0.001**
≤45	62 (59.6)	41.76±6.12		
>45	42 (40.4)	47.74±9.94		
Gender			0.283	0.778
Female	78 (75.0)	44.31±8.23		
Male	26 (25.0)	43.77±8.97		
Illness period (month)			-3.375	0.001**
≤14	67 (64.4)	42.21±7.60		
>14	37 (35.6)	47.73±8.64		
Education			0.770	0.466
Junior school	24 (23.1)	42.71±7.99		
Senior school	29 (27.9)	43.66±8.93		
College/University	51 (49.0)	45.16±8.27		
Work status			-0.404	0.687
Retired	18 (17.3)	43.44±5.67		
Working	86 (82.7)	44.33±8.86		
Monthly income (RMB)			0.711	0.586
≤1999	13 (12.5)	45.46±8.58		
2000–2999	14 (13.5)	45.79±6.84		
3000–3999	31 (29.8)	43.39±9.09		
4000–4999	18 (17.3)	41.83±8.97		
≥5000	28 (26.9)	45.14±7.91		
Source of treatment payment			3.293	0.002**
Self-pay	46 (44.2)	47.24±10.14		
Healthcare	58 (55.8)	41.74±5.67		
Marital status			-5.759	<0.001**
Single/divorced/separated	77 (74.0)	41.73±6.73		
Married	27 (26.0)	51.15±8.81		
Residence			0.647	0.526
City	37 (35.6)	43.73±8.55		
Town	42 (40.4)	45.26±8.81		
Country	25 (24.0)	43.00±7.44		
Smoking			-0.142	0.887
Yes	24 (23.1)	43.96±9.19		
No	80 (76.9)	44.24±8.18		
Drinking			-0.718	0.475
Yes	15 (14.4)	42.73±9.54		
No	89 (85.6)	44.42±8.20		

**Note:** \*\* $P < 0.01$  was considered statistically significant.



**Figure 1** Correlation between SAS scores and illness period in patients with CP.

## Correlation Between SAS Scores and Illness Period in Patients with CP

The relationship between SAS scores and illness period in patients with CP was analyzed by Pearson correlation test. The illness period was found to be positively related to SAS scores in patients with CP ( $r = 0.378$ ,  $P = 0.001$ ; [Figure 1](#)).

## Binary Logistic Regression Analysis of the Influencing Factors of Anxiety in Patients with CP

Binary logistic regression analysis was used to analyze the influencing factors of anxiety state in patients with CP. The anxiety status of patients was taken as dependent variable, and the factors with significant differences in [Table 1](#) were included as independent variables in the logistic regression model. The assignment of dependent variables and independent variables is given in [Table 2](#).

The results of binary logistic regression analysis showed that age, source of treatment payment, and marital status were the independent risk factors affecting the anxiety status of patients with CP ( $P < 0.05$ ; [Table 3](#)). Specifically, CP patients with advanced age, self-pay, and unmarried status had higher risk for anxiety.

**Table 2** Variable Assignment Table of Binary Logistic Regression Analysis of Anxiety in Patients with CP

Variable	Assignment
Dependent variable Anxiety	No (score < 50) = 0; Yes (score > 50) = 1
Independent variables	
Age	$\leq 45 = 0$ ; $> 45 = 1$
Illness period	$\leq 14 = 0$ ; $> 14 = 1$
Source of treatment payment	Self-pay = 0; Healthcare = 1
Marital status	Single/divorced/separated = 0; Married = 1

**Table 3** Binary Logistic Regression Analysis of Anxiety in Patients with CP

Items	$\beta$	SE	Wald	P	OR (95% CI)
Age	3.831	1.158	10.935	0.001**	46.090 (4.760–446.312)
Illness period	1.138	0.797	2.039	0.153	3.119 (0.654–14.869)
Source of treatment payment	-2.226	0.905	6.048	0.014*	0.108 (0.018–0.636)
Marital status	-2.264	0.819	7.638	0.006**	0.104 (0.021–0.518)

**Note:** \* $P < 0.05$ , \*\* $P < 0.01$  was considered statistically significant.

**Abbreviations:**  $\beta$ , coefficient for adjusted OR; SE, standard error; OR, adjusted odds ratio; CI, confidence interval.

## Discussion

To the best of our knowledge, this is the first study to evaluate the anxiety level and potentially influencing factors in patients with CP, with the aim to provide insights for the management of anxiety in CP patients. Three main findings emerged in the present study. Firstly, the average SAS score of 104 patients with CP was ( $44.17 \pm 8.38$ ), including 22 cases (21.15%) with anxiety. Secondly, the illness period was found to be positively related to SAS scores in patients with CP. Thirdly, age, source of treatment payment, and marital status were the independent risk factors affecting the anxiety status of patients with CP.

SAS, a self-report questionnaire that includes 40 items on a 4-point rating scale, can accurately reflect and differentiate the subjective feelings of anxious psychopaths and healthy people.<sup>14</sup> SAS was used to assess the patients' anxious status in numerous studies.<sup>15–17</sup> The Chinese version of SAS has good reliability and validity.<sup>18</sup> Thus, SAS was selected to measure the status of anxiety in patients with CP in the present study.

Psychiatric disorders are prevalent in pharyngitis patients. In the present study, the incidence of anxiety in patients with CP was 21.15% (22/104). To the best of knowledge, this is the first report on the incidence of anxiety in patients with CP in China. According to the latest nationwide survey of mental disorders in China, the lifetime prevalence of anxiety disorders is 7.6%.<sup>19</sup> Our results suggested that the incidence rate of anxiety is significantly higher in patients with CP than in the general population. This phenomenon may be attributed to two reasons: (1) CP has the characteristics of long illness duration, easy recurrence, long treatment time, and high treatment cost, which may easily increase the anxiety level of patients; (2) patients with CP are concerned about the possibility of consequences such as aphasia and malignant tumors. Moreover, the illness period was found to be positively related to the level of anxiety in patients with CP in the present study. Thus, it is suggested that patients with repeated symptoms of CP should also receive psychiatric assessment and support.<sup>20</sup>

Our results showed that CP patients with advanced age had higher risk for anxiety. Common anxiety disorder is the most common among mental disorders in patients of advanced age group.<sup>21</sup> It has been reported that anxiety symptoms can always increase with age.<sup>22</sup> Recently, advanced age was found to be associated with high-level of anxiety in 2625 adults in the community and 1363 patients at health center.<sup>23</sup> Being in the age of 45 and older has a two-fold increased chance of having severe anxiety symptoms compared to being in age 18 to 24.<sup>23</sup> Mechanistically, a rat model study has revealed that in response to behavioral changes, certain regions of the fear/anxiety circuit (amygdala, hippocampus, and hypothalamus) in the brain experience age-related modifications.<sup>24</sup> Thus, clinicians should pay attention to the anxiety state of CP patients, especially those with advanced age.

Previous studies suggested that common mental illnesses, including significant levels of anxiety symptoms, can be prevented by having a high degree of social and economic status.<sup>25</sup> Anxiety at a high level is negatively influenced by lower wealth status.<sup>23</sup> In a prospective study, low household income was found to increase the risk of high-level anxiety symptoms and other common mental disorders, while living in a good economic class significantly reduces the risk of high-level anxiety symptoms.<sup>26</sup> In the present study, self-pay patients had higher risk for anxiety compared to those with healthcare payment. However, there was no statistical significance in anxiety of patients with CP with different monthly income. It has been reported that monthly income was shown to have significant impacts on anxiety symptoms among stroke patients,<sup>27</sup> patients with liver transplantation,<sup>28</sup> and dialysis patients.<sup>29</sup> It is unclear why monthly income of patients with CP had no impact on anxiety symptoms in the present study. Since this study is a single-center study and the sample size is relatively small, the differences in anxiety symptoms among CP patients with different monthly incomes should be confirmed by multicentric studies.

Social relationships or integration are crucial for improving lifelong mental health.<sup>30</sup> As a social being, human requires belonging as a fundamental requirement for good social relationships. In contrast, loneliness increases the risk of anxiety symptoms, leading to serious mental health problems.<sup>31,32</sup> Living alone was found to be a greater risk factor for high levels of anxiety than living with a family, and participants' living conditions have been linked to high levels of anxiety.<sup>23</sup> Consistently, the results of the present study showed that CP patients with unmarried status exhibited higher level of anxiety.

There are some limitations to this study. Firstly, the small sample size and single-center design of the current study may indicate sampling bias. Secondly, the ability to examine the relationships between cause and effect for all factors was limited due to the cross-sectional study design. Longitudinal studies are needed. Thirdly, the information on these comorbidities including Globus Hystericus, Laryngopharyngeal Reflux, and Gastroesophageal Reflux was not collected. Patients with CP should be classified according to these complications and the differences in anxiety symptoms among these groups should be compared to observe the effect of these complications on anxiety symptoms of CP patients.

In conclusion, the incidence of anxiety in patients with CP is high. Clinicians should pay extra attention to the anxiety state of CP patients, especially those with advanced age, self-pay, and unmarried status. Further research is warranted to confirm the potential benefit of psychological intervention for anxiety disorders in individuals with CP.

## Disclosure

Authors have no conflict of interest to declare.

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