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Statistical Analysis of the Insurance System of Chronic Obstructive Pulmonary Disease in Society Members of Economic Law

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Abstract: In order to study the influencing factors of patients with stable chronic obstructive pulmonary disease (COPD), the insurance system was statistically analyzed based on the results of the study. Questionnaires were used to investigate the disease cognition and treatment compliance of 135 patients with stable COPD. 90 patients with poor compliance were randomly divided into treatment group (45 cases) and control group (45 cases). After 6 months of health education intervention, the treatment group observed changes in disease cognition and treatment compliance.46.7% of patients had good treatment compliance. After 6 months of health education intervention, the compliance of the treatment group was significantly higher than that of the control group, and the difference was statistically significant (P<0.05).According to the results of the research, the insurance system was statistically analyzed. It was found that the insurance system of chronic obstructive pulmonary disease among members of the economic law is different from other diseases and should be specially formulated.

Keywords: Socioeconomic members; Chronic obstructive pulmonary disease; Insurance system; Statistical analysis

1. Introduction

Chronic obstructive pulmonary disease (COPD) is a major health and socioeconomic burden and one of the four leading causes of death in the world. It is a disease characterized by airflow limitation and is not completely reversible. Airflow limitation usually develops progressively and is accompanied by abnormal inflammatory reaction of lung to harmful particles or gases. The patient may have symptoms such as shortness of breath, cough and expectoration. More than in middle age, onset, slow progress of the disease. Smoking is the most important risk factor for COPD. Exposure to occupational dust and compounds, indoor air pollution, outdoor air pollution, passive smoking, respiratory tract infection in infancy are all important risk factors to induce COPD. The total energy consumption of the human body is composed of the heat generation effect of drugs, the heat generation effect of food, the energy consumption of physical activity, and the basic energy consumption, in which the proportion of basic energy consumption is the highest. Energy consumption varies from individual to individual during physical activity. In clinic, the amount of resting energy is obviously more than the basic energy consumption. Resting energy mainly refers to the energy consumption of the human body measured at 2 hours after meal, when the patient lies still or sits still for more than half an hour, usually the resting energy is 10 times higher than the basic energy[1]. In general, the resting energy of patients with chronic obstructive pulmonary disease is significantly increased, which may be related to the decrease of SaO2, PaO2 and airway obstruction. Resting oxygen consumption directly reflects the level of resting energy consumption in the human body. Resting oxygen consumption in patients with normal weight lung disease was significantly higher than that in normal controls. The study also showed that chronic obstructive pulmonary disease patients did have high metabolism. In order to further improve the medical security system for urban and rural residents, improve the multi-level medical security system, and effectively improve the level of protection for serious and serious diseases, The six ministries and commissions of the State Council jointly promulgated the guiding opinions on the Development of serious illness Insurance for Urban and Rural residents (hereinafter referred to as "opinions"), and for the first time designed the relevant regulations for the insurance of serious illness of urban and rural residents in China from the system level[2].

2. Factors Affecting Energy Metabolism in Patients with Chronic Obstructive Pulmonary Disease

2.1. Serum leptin

Serum leptin is a hormone from adipocytes that can be transmitted and fed back in the human brain to guide patients to reduce food intake and affect fat metabolism. The concentration of leptin in serum has circadian rhythms, reaching a significant peak at night, while in patients with no cachexin, the level of leptin in serum is normal circadian rhythm, but in patients with cachexia, Its leptin level has lost its circadian rhythm, so it is possible to preliminarily judge the nutritional level of patients by measuring leptin level[3].

2.2. Tumor necrosis factor

Tumor necrosis factor (TNF) is a pro-inflammatory polypeptide cytokine which can inhibit the general activity of lipoprotein enzyme and promote the catabolism of muscle protein and the metabolism of amino acids. Tumor necrosis factor can mediate the development of systemic inflammation in patients with tissue consumption, and the serum tumor necrosis factor concentration in patients with chronic obstructive disease is significantly higher than that in stable stage. However, when the patients with severe malnutrition were in stable and acute stage, the level of tumor necrosis factor in serum was not significant, which may be caused by acute infection[4]. Tumor necrosis factor levels in stable and acute exacerbations of malnutrition patients were significantly higher than those in normal nutrition patients, so there was no significant relationship between tumor necrosis factor content and fat-free constitution. Tumor necrosis factor (TNF) can accelerate the adipose tissue interpretation of patients and reduce their weight. Trivedi Hariprasad S et al also found that the levels of soluble tumor necrosis factor receptor (TNF- R) in the blood of patients with emphysema of normal body weight were significantly higher than those in normal subjects. Resting energy consumption and corticosteroid use are not related[5].

2.3. Protein metabolism

Some patients with chronic obstructive pulmonary disease have lower branched amino acids in plasma and abnormal amino acid spectrum of skeletal muscle. Their plasma leucine-skeletal muscle gradient was also higher than normal. In patients with emphysema, the content of amino acids in skeletal muscle increased, while the decrease of glutathione might be associated with high glycolysis. Studies have shown that when patients with weight loss are given oral protein assimilation hormone oxomethyl, their body weight increases significantly, while electrical resistance analysis shows that the weight gain of patients is mainly due to their weight and fat-free constitution. Patients with chronic obstructive pulmonary disease (COPD) with decreased testosterone levels have significantly increased body weight and fat-free constitution if treated with testosterone[6]. Hunger hormone is a polypeptide hormone that increases appetite and reduces fat consumption in the body. Compared with normal weight patients, the levels of hunger hormone in plasma of low weight patients were significantly higher than those of normal weight patients, and the indexes of noradrenaline and interleukin-6 were also significantly higher than those of normal weight patients. After the first dose of hunger hormone was given to the patients with chronic obstructive pulmonary disease with cachexia, the growth hormone in the serum of the patients increased by about 20 times. After 3 weeks of injection of hunger hormone, the intake of chronic obstructive pulmonary disease patients increased significantly. At the end of treatment, body weight increased significantly, respiratory muscle strength and limb muscle strength gradually increased, and walking distance of 6 min increased significantly, which indicated that hunger hormone could improve fat consumption in patients with chronic obstructive pulmonary disease[7].

3. Statistical Analysis of Chronic Obstructive Pulmonary Disease Insurance System Among Social and Economic Members

3.1. Research objects and methods

The disease cognition and therapeutic compliance of 135 patients with stable COPD were investigated by questionnaire. 90 patients with poor compliance were randomly divided into treatment group (45 cases) and control group (45 cases). After 6 months of health education intervention, the treatment group observed the changes of disease cognition and treatment compliance. Wherein, there are 467 patients, 345 were female and 122 were male, with an average age of (40 ±9.5) years. The age distribution of the subjects is shown in Table 1.

Table 1. Age distribution of study subjects

Age group	Number of male	Proportion of male /%	Number of female	Proportion of male /%
21～30	32	6.23	42	2.23
31～40	21	9.34	11	3.22
41～50	52	17.57	32	8.34
51～60	134	25.65	32	13.34

61～70	43	9.44	32	3.43
71～80	2	0.34	3	0.34
Total	299	68.45	121	33.56

3.2. Statistical analysis technique

When metabolism is needed, the human body can say that triacylglycerol stored in adipose tissue is hydrolyzed into free fatty acids, and albumin binds to fatty acids with water solubility, thus entering the process of metabolism and productivity. When the human body does not need too much free fatty acid, the free fatty acid in the plasma reenters into the liver of the patient, then changes to triacylglycerol, then arrives in the blood as low density lipoprotein, and stores in the adipose tissue[8]. Sympathetic nerves regulate fat metabolism, and catecholamines promote the decomposition of triglycerides into fatty acids and glycerol. Compared with the normal control group, the body fat content of the patients with chronic obstructive pulmonary disease of normal body weight was relatively high, and the body fat content was still relatively high after weight loss. They may be associated with a-adrenergic receptor-mediated decline in the mechanism of pyrolysis. According to the different causes of infection, the subjects were divided into six groups: chronic obstructive pulmonary disease, associated chronic obstructive pulmonary disease, hyperlipidemia and chronic obstructive pulmonary disease. Surgery is associated with chronic obstructive pulmonary disease, trauma associated with chronic obstructive pulmonary disease and others[9]. The number of patients with different chronic obstructive pulmonary diseases is detailed in Table 2.

Table 2. Detailed number of patients with different chronic obstructive pulmonary diseases

Cause of disease	Number of people	Percentage /%
Chronic obstructive pulmonary	143	11.32
Associated chronic obstructive pulmonary disease	200	28.54
Hyperlipidemia associated chronic obstructive pulmonary disease	112	14.21
Surgical associated chronic obstructive pulmonary disease	220	13.66
Traumatic associated chronic obstructive pulmonary disease	145	14.55
Else	187	12.44

Previously, it was thought that one of the reasons for the increasing metabolic rate in patients with chronic obstructive pulmonary disease was the increased work done by the respiratory muscles, because when sex and age were the same, the energy consumption in patients with chronic obstructive pulmonary disease was higher than that in normal controls. However, resting energy expenditure did not return to normal after nasal intermittent positive pressure ventilation in patients with high metabolic rate chronic obstructive pulmonary disease. Therefore, the worse the pulmonary function of patients with chronic obstructive pulmonary disease, the more energy expenditure they spend during ventilation, but this does not mean that the metabolic rate of patients is also increased[10-12].

4. Statistical Analysis Model Construction

4.1. Big data analysis of chronic obstructive pulmonary disease insurance system

To analyze the relationship between the social and economic members' chronic obstructive pulmonary disease insurance system and the effect of treatment, by using principal component analysis (PCA) and FMOLS empirical test method[13], the validity game model of the decision of the social economic members' chronic obstructive pulmonary disease (COPD) insurance system is constructed. A binary Logistics regression model was established to analyze the constraint index of the social and economic members' chronic obstructive pulmonary disease insurance system, assuming the limited data set of decision variables for earnings management of the social economic members of the chronic obstructive pulmonary disease insurance system:

$$X = \{x_1, x_2, \cdots, x_n\} \subset R^s \quad (1)$$

Where, the data set contains N samples representing the cash flow composition of the chronic obstructive pulmonary disease insurance system. The normalized feature vector of the sample Steam x_i , $i = 1, 2, \cdots, n$ is expressed as follows:

$$x_i = (x_{i1}, x_{i2}, \cdots, x_{is})^T \quad (2)$$

The limited set of capital of COPD insurance is classified into category c, in which 1 < c < n, earnings management and significant positive correlation analysis are used to set up the research hypothesis. Hypothesis 1: in the primary stage of the chronic obstructive pulmonary disease insurance system, the higher the level of capital using the financing decision model, the shorter the therapeutic effect adjustment period after the financing of the chronic

obstructive pulmonary disease insurance system[14]. The greater the effect of treatment, the greater the effect. Based on this assumption, the significant positive correlation between the use of the chronic obstructive pulmonary disease insurance system and real earnings management is described as:

$$V = \{v_{ij} \,|\, i = 1,2,\cdots,c, j = 1,2,\cdots,s\} \tag{3}$$

The V_i is the i vector (the i positive correlation center vector) of the variables interpreted under the double chronic obstructive pulmonary disease insurance scheme. To construct a set of qualified conditions for the effectiveness of the social and economic members of the chronic obstructive pulmonary disease insurance system[15], calculate the positive correlation coefficient and the significant level of the chronic obstructive pulmonary disease insurance system financing fuzzy matrix, expressed as:

$$U = \{\mu_{ik} \,|\, i = 1,2,\cdots,c, k = 1,2,\cdots,n\} \tag{4}$$

Control objective function of the chronic obstructive pulmonary disease insurance system is expressed as:

$$J_m(U,V) = \sum_{k=1}^{n}\sum_{i=1}^{c} {\mu_{ik}}^m (d_{ik})^2 \tag{5}$$

Combined with the constraint conditions of the efficacy of the chronic obstructive pulmonary disease insurance system among the social and economic members, the multivariate regression constraint extremum of the chronic obstructive pulmonary disease insurance system is obtained by using the Lagrange theorem:

$$\mu_{ik} = \Big/ \sum_{j=1}^{c} (d_{ik} \Big/ d_{jk})^{\frac{2}{m-1}} \tag{6}$$

Thus, the chronic obstructive pulmonary disease insurance system big data statistical analysis is realized.

4.2. Statistical optimization of insurance system for chronic obstructive pulmonary disease

By using the Logistics chaotic mapping, the autoregressive model for the control of the chronic obstructive pulmonary disease insurance system of social and economic members is obtained as follows:

$$x_n = \varphi_0 + \sum_{i=1}^{p} \varphi_i x_{n-i} + \sum_{j=0}^{q} \theta_j \eta_{n-j} \tag{7}$$

The rank of $x(n)$ is rearranged for the key data of the decision effectiveness of social and economic members of COPD. By Logistics regression analysis, the rearranged data sequence of the statistical data of the social and economic members' chronic obstructive pulmonary disease insurance system is obtained as follows:

$$r_n = y(x_n) = y_{\mathrm{rank}(x_n)}, \qquad n = 1,2,\cdots,N \tag{8}$$

In order to reflect the diversity of the statistical data groups of the social and economic members of the chronic obstructive pulmonary disease insurance system, In the definition of social and economic members of the chronic obstructive pulmonary disease insurance system after the lever adjustment of the index composite factor mf :

$$mf = \frac{1}{NP}\sum_{i=1}^{NP}(f(x_i) - \overline{f(x)})^2 \tag{9}$$

For the problem of S value, according to the rate of return of chronic obstructive pulmonary disease insurance, the Sigma test is used to determine the validity of financing. By using the Hausman test method, the confidence and confidence intervals of hypothesis 1 and hypothesis 2 are described as follows:

$$p(Q_s) = \frac{1}{\sqrt{2\pi}\sigma_s}\exp\left[-\frac{(Q_s - \langle Q_s\rangle)^2}{2{\sigma_s}^2}\right] \tag{10}$$

$$\int_{-\infty}^{\infty} p(Q_s)\,dQ_s = 1 \tag{11}$$

To realize the quantitative estimate of the correlation between the chronic obstructive pulmonary disease insurance system and the therapeutic effect of socioeconomic members, obtained $z_2 = -z_1 = 1.96$, according to the mathematical statistical knowledge, the following conclusions can be obtained:

$$\left|\langle Q_s\rangle - Q_c\right| \Big/ \sigma_s = z_1 = 1.96 \approx 2.00 \tag{12}$$

Therefore, a criterion for the correlation analysis between the chronic obstructive pulmonary disease insurance system and the therapeutic effect can be obtained.

5. Empirical Data Analysis

On the basis of the quantitative evaluation model of the relationship between the COPD insurance system and the therapeutic effect of the above socioeconomic members, the empirical data analysis is carried out. The data analysis software is Excel2007 and SPSS19.0. The mathematical model of the association analysis between the chronic obstructive pulmonary disease insurance system and the therapeutic effect of social and economic members was constructed with Matlab mathematical programming. The contribution degree of the principal component model was set to 0.621, and the FME=1, correlation factor is t=2.283, $\beta = 3.831$. The correlation between the main statistical variables is shown in Table 3. The results of the statistical analysis are shown in figure 1.

Table 3. Correlation of main variables

	SC	PC	Size	MB	ALR	Profitability	Age
SC	1	0.323***	0.334	0.233	0.233*	0.454	0.554

PC	0.242**	1	0.132	0.234	0.044	0.345*	0.433
Size	0.332	0.132	1	0.032**	0.543**	0.356	0.244***
MB	0.343	0.034	-0.212	1	0.132	0.655	0.333
ALR	0.123**	0.354**	-0.233	-1.211	1	0.044**	0.222
Profitability	0.344	0.154	0.134***	0.123	0.322	1	0.333
Age	0.356*	-0.333	0.233*	0.343***	0.333	0.056*	1

Note: *, ** and *** indicate significant levels of 1%, 5% and 10%, respectively.

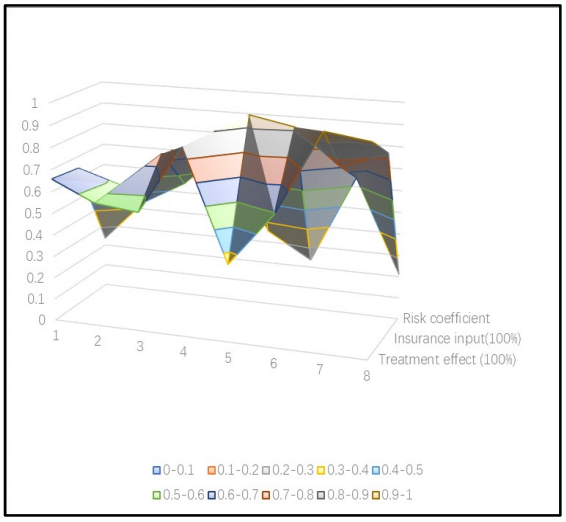

Figure 1. Results of statistical analysis

Figure 1 shows that 46.7% of the patients have good therapeutic compliance. After 6 months of health education intervention, the compliance of the treatment group was significantly higher than that of the control group ($P < 0.05$). It can be known that, according to the results of the study, the insurance system for statistical analysis. Find that the chronic obstructive pulmonary disease insurance system among economic members is different from other diseases and should be specially developed.

6. Conclusions

In this paper, the insurance system of COPD patients with chronic obstructive pulmonary disease is studied. According to the results of the study, we study the insurance system of COPD)patients with chronic obstructive pulmonary disease. To investigate the influencing factors of chronic obstructive pulmonary disease patients. The disease cognition and therapeutic compliance of 135 patients with stable COPD were investigated by questionnaire. 90 patients with poor compliance were randomly divided into treatment group (45 cases) and control group (45 cases). After 6 months of health education intervention, the treatment group observed the changes of disease cognition and treatment compliance. The results showed that 46.7% of the patients had good therapeutic compliance. After 6 months of health education intervention, the compliance of the treatment group was significantly higher than that of the control group ($P < 0.05$). According to the results of the study, the statistical analysis of the insurance system is carried out. It is found that the chronic obstructive pulmonary disease insurance system among economic members is different from other diseases.

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