

Analysis of the Influencing Factors of the Deficiency of Public Health Security System in Colleges and Universities during the Epidemic Situation in COVID-19

-- Based on Multiple Logistic Regression Model

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Abstract

With the promotion of the resumption of work, colleges and universities have actively established relevant epidemic prevention and control work systems and epidemic prevention and control teams, and actively established and improved the mechanism for responding to public health emergencies to ensure the health and safety of teachers and students. However, there are still some shortcomings in public health safety in colleges and universities, such as insufficient initial investment, poor mechanism and scattered personnel. In this paper, the correlation test and multiple Logistic regression model were used to conduct relevant research and analysis, and to explore the influencing factors and countermeasures of the deficiencies of public health security system in colleges and universities during the COVID-19 epidemic.

Keywords

Public Health Security System in Colleges and Universities; Epidemic Prevention and Control; Logistic Regression Model.

1. Introduction

It is an important part of college society, and college students come from all corners of the country. The soundness and effectiveness of its public health and safety system not only profoundly affects the life, health and safety of teachers and students, but also relates to the long-term stability of the country. In this paper, universities in Hefei, Bengbu, Chuzhou and Lu 'an of Anhui Province are taken as research objects, Through the investigation of CNKI, Wanfang, VIP literature, etc., collect all kinds of information to understand the establishment, practical application and implementation of public health security system in colleges and universities; Through online and offline questionnaires and on-the-spot investigation, the present situation of public health security system in colleges and universities is comprehensively and deeply investigated. Select valuable information data to analyze the research points of this project; By using the method of correlation test and establishing multiple Logistic regression model, relevant research and analysis were carried out, and the conclusion of public health safety management system and measures that meet the needs of colleges and universities was drawn in combination with their actual situation.

2. The Status and Role of Public Health Security System in Colleges and Universities

Campus public health safety is closely related to every teacher, student, parent and society. School public health safety system is a very important part of school public health safety work. The routine measures of prevention and control in COVID-19 are very effective for many mass

diseases in schools, In fact, the infectious diseases among students are similar to those in COVID-19, and they can all be found through temperature or some basic examinations. Although in the past, we highly praised the spirit of keeping minor injuries in the line of fire, the current understanding is somewhat upgraded, and only a complete state is the best way to solve the problem, so as long as there are minor problems, Timely discovery and timely solution are helpful to one's own personal health and the whole class's collective health, which requires a healthy maintenance system: public health security system in colleges and universities. Therefore, the establishment and guarantee of the system can give students a warm harbor, Such a school family can also provide students with better quality space.

As a holy place for education, schools bear the responsibility of nurturing talents and enhancing the combat effectiveness of national culture. An excellent school must have a good management system, which is an invisible hand to promote students' physical and mental development. College students are the reserve force for national development, Perfecting the public health security system in colleges and universities is of great significance to promoting students' all-round development and maintaining campus security.

3. Research Methods and Analysis Models

3.1. Research Methods

In order to achieve the original research goal, this paper mainly adopts literature research, questionnaire survey and empirical analysis. Among them, the questionnaire design in the questionnaire survey method mainly includes the introduction, basic personal information, and the measurement of related variables affecting the deficiency of public health security system in colleges and universities. These three parts mainly include: The implementation of public health safety system in colleges and universities, the improvement of health facilities and other hardware facilities, and the influence of public health safety education on the implementation of public health safety system.

3.2. Analysis Model

Pearson and Spearman correlation analysis were used to determine the significant factors. Correlation analysis is a statistical method, which is used to study certain dependencies among various phenomena and measure the correlation between these dependencies. [1].

The multivariate Logistic regression analysis model is used to further analyze the significant factors, and P is introduced to study the relationship between the probability variable P with a certain value of dependent variable Y and X, and the Logistic regression model is established. When the dependent variable is 0,1 and the independent variable is $x_1 \dots x_m$, the multivariate Logistic regression model is $P_1 = P(y = 1 | x_1, x_2, \dots, x_m) = \frac{\exp(\alpha_1 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_m)}{1 + \exp(\alpha_1 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_m)}$

$$P_0 = P(y = 0 | x_1, x_2, \dots, x_m) = 1 - P_1$$

Another form is: $\text{logit}(P_i) = \ln \frac{P_i}{1-P_i} = a + \beta_x$.

This paper studies the factors that affect the deficiency of public health security system in colleges and universities, so the dependent variable is the frequency of public health security incidents in colleges and universities, and the number of dependent variables is 4 (0-3 times, 4-6 times, 7-9 times, 10 times and above), and the independent variables are many factors that affect the public health security system. Therefore, this paper uses multivariate and multivalued logistic regression model to study the influencing factors of the deficiency of public health security system in colleges and universities.

4. Description of Sample Data

4.1. Personal Characteristics of Interviewees

In order to know about the public health security system in colleges and universities, our team conducted a questionnaire survey in Hefei, Bengbu, Chuzhou and Lu 'an, Anhui Province. 95 copies were collected offline, 231 copies were collected online (78 copies were automatically rejected after the screening questions were removed), and 326 questionnaires were collected. After screening, 256 valid questionnaires were obtained, with an effective questionnaire rate of 78.53%.

Table 1. Questionnaire

Individual index characteristics	classify	frequency	Percentage/%
gender	man	122	47.66%
	woman	134	52.34%
grade	freshman	31	12.5%
	Sophomore	101	39.45%
	junior	69	26.95%
	senior	54	21.09%

4.2. Respondents' Satisfaction with Public Health in Colleges and Universities

In the questionnaire, there are two questions about respondents' satisfaction with public health in colleges and universities. One is their satisfaction with the formulation of epidemic prevention system and emergency measures in their colleges and universities, and the other is their satisfaction with the canteens and dormitories in their schools. In the former question, among the 256 respondents, 24.22% of the people thought they were satisfied, 38.67% were satisfied, 4.69% were dissatisfied, and 30.47% hold basic recognition attitude. In the latter question, of the 256 respondents, 23.44% were satisfied, 37.11% were satisfied, 7.42% were dissatisfied, and 29.3% were basically satisfied. It can be seen from these data that most students' satisfaction with public health in colleges and universities is not very high.

4.3. Respondents' Knowledge of Public Health Security System in Colleges and Universities

32.03% of the people know about the public health and safety system in their school, 45.31% know a little, and 22.66% don't. According to the survey data, most students do not fully understand the public health and safety system of their school. In addition, the management and supervision system of public health safety was found through questionnaire survey, 26.95% of the people said they didn't know. This is mainly because it is difficult for students to get in touch with the public health security system. In addition, this system is not transparent to students, and school education is not in place.

5. Model Establishment and Analysis

5.1. Select Variables

To study the factors that influence the establishment of public health safety system in colleges and universities, through the above analysis, this paper selects the frequency (y) of public health safety incidents in colleges and universities as the dependent variable, The independent variables are gender (X1), grade (X2), public health goods management (X3), infectious disease isolation places (X4), health facilities (X5), human management (X6), students (X7), teachers (X8), other school staff (X9), supervision and management (X10).

Table 2. Selection and setting of variables

variable	Variable setting
Gender (X1)	1= male, 2= female
Grade (X2)	1= freshman, 2= sophomore, 3= junior and 4= senior.
Management factors of public health goods (X3)	1= very satisfied, 2= satisfied, 3= average, 4= dissatisfied, 5= very dissatisfied.
Isolated places of infectious diseases (X4)	1= yes, 2= no.
Health facilities factor (X5)	1= yes, 2= no
Management factors for people (X6)	1= yes, 2= no
Human factors of students (X7)	1= yes, 2= no
Human factors of teachers (X8)	1= yes, 2= no
Other factors of school staff (X9)	1= very satisfied, 2= satisfied, 3= average, 4= dissatisfied, 5= very dissatisfied.
Supervision and management factors (X10)	1= yes, 2= no
Frequency of Public Health Safety Incidents in Colleges and Universities (Y)	1=0-3 times, 2=4-6 times, 3=7-9 times, 4=10 times and above.

5.2. Correlation Analysis

Table 3. Spearman correlation analysis

project	Spearman correlation coefficient	Saliency (two tails)	Number of cases
X1	0.177	0.060	114
X2	-0.241	0.010	114
X3	0.281	0.002	114
X4	0.386	0.000	114
X5	0.497	0.000	114
X6	0.092	0.332	114
X7	0.455	0.000	114
X8	0.598	0.000	114
X9	0.335	0.000	114
X10	0.558	0.000	114

It can be seen from Table 2 that according to the correlation coefficient and significant P-value results, infectious disease isolation places (X4), health facilities (X5), students' artificial factors (X7), teachers' artificial factors (X8), other school staff's factors (X9) and supervision and management factors (X10) affect the establishment of public health in colleges and universities. Through the above results, it is preliminarily considered that the number of public health safety incidents in colleges and universities with isolated places of infectious diseases, in-school staff obeying epidemic prevention regulations and better health supervision is less.

5.3. Multiple Logistic Regression Analysis

5.3.1. Establish Logistic Regression Model

Assuming that the frequency of public health safety incidents in colleges and universities is taken as the evaluation variable Y, Y=1 or 2 or 3 or 4, the non-significant factors affecting the establishment of public health safety system in colleges and universities will be removed through the above related analysis results. Seven significant variables were obtained, including infectious disease isolation place (X4), health facilities (X5), students' artificial factors (X7), teachers' artificial factors (X8), other school staff factors (X9) and supervision and management

factors (X10), and a multiple Logistic regression model was established. See Table 3 for its specific variables and variable assignments.

Table 4. Logistic regression variable setting and assignment

variable	Variable assignment
Frequency of Public Health Safety Incidents in Colleges and Universities (Y)	1=0-3 times, 2=4-6 times, 3=7-9 times, 4=10 times and above.
Isolated places of infectious diseases (X4)	1= yes, 2= no.
Health facilities factor (X5)	1= yes, 2= no
Human factors of students (X7)	1= yes, 2= no
Human factors of teachers (X8)	1= yes, 2= no
Other factors of school staff (X9)	1= very satisfied, 2= satisfied, 3= average, 4= dissatisfied, 5= very dissatisfied.
Supervision and management factors (X10)	1= yes, 2= no

5.3.2. Solve the Regression Model

In the likelihood ratio test, the health facility factor X5(sig.=0.987) failed the significance test, so the regression was repeated after X5 was removed. In the repeated likelihood ratio test results, the public health goods management factor X4(sig.=0.291) failed the significance test, so the regression was continued after X4 was removed. In the result of likelihood ratio test of continuous regression, other school staff factors X9(sig.=0.12) did not pass the significance test, so the X9 was removed and the regression was repeated; In the likelihood ratio test results of repeated regression, the student human factor X7(sig.=0.218) failed the significance test, so the regression was repeated after X7 was removed, and the output results (see Table 4) showed that the significance of model fitting information P value was < 0.01, indicating that the variable coefficients were not all 0.[2], and has significant statistics, and the whole model has value; Teachers' human factors X8 and supervision and management factors X10 have all passed the likelihood ratio test, which shows that these two factors have great influence on the establishment of public health system in colleges and universities. Table 5 below shows the estimated values of model parameters.

Table 5. likelihood ratio test

effect	Model fitting condition	likelihood ratio test		
	-2 Log Likelihood of Simplified Model	chi-square	freedom	significance
intercept	30.581	0.000	0	
X8	54.718	24.137	3	0.000
X10	48.396	17.815	3	0.000

5.3.3. Analysis of Regression Results

In the likelihood ratio test, the P values of variables X8 and X11 are not greater than 0.05, so the independent variables X8 and X11 have statistical value, that is, teachers' artificial factors and supervision and management factors are related to the establishment of public health security system in colleges and universities. The partial regression coefficient of X8 is 20.262, and the exp (b) value is 630381699. That is, the ratio of the probability of fewer health safety incidents to the probability of more health safety incidents in colleges and universities that provide public health training and education to college teachers is 630,381,699 times that in colleges and universities that do not provide public health training and education to college teachers; The partial regression coefficient of X11 is 1.572, and the exp (b) value is 4.818. It shows that the ratio of the probability of fewer health safety incidents to the probability of more incidents in colleges and universities with proper public health supervision and management is 4.818 times

that of colleges and universities without public health training and education for college teachers.

Table 6. Partial data of estimated values

Parameter estimation							
Frequency of public health safety incidents in Colleges		B	Standard error	Wald	freedom	Significance	Exp(B)
1	intercept	0.026	0.898	0.001	1	0.977	
	[X8 teacher human factors = 1]	20.262	0.556	1328.073	1	0.000	630381699.3
	[X8 teacher human factors = 2]	0 ^b			0		
	[X11 supervision and management factor = 1]	1.572	1.352	1.353	1	0.245	4.818
	[X11 supervision and management factor = 2]	0 ^b			0		
2	intercept	2.137	0.746	8.208	1	0.004	
	[X8 teacher human factors = 1]	18.299	0.000		1		88542325.79
	[X8 teacher human factors = 2]	0 ^b			0		
	[X11 supervision and management factor = 1]	-0.336	1.298	0.067	1	0.796	0.714
	[X11 supervision and management factor = 2]	0 ^b			0		
3	intercept	0.916	0.837	1.199	1	0.273	
	[X8 teacher human factors = 1]	1.025	3657.354	0.000	1	1.000	2.786
	[X8 teacher human factors = 2]	0 ^b			0		
	[X11 supervision and management factor = 1]	-17.346	3695.727	0,000	1	0.996	2.929E-08
	[X11 supervision and management factor = 2]	0 ^b			0		

From the above analysis, we can get the influence of these two factors on the establishment of public health safety system in colleges and universities: the colleges and universities that provide public health safety education and training for teachers in colleges and universities

have fewer public health incidents and can establish a better public health safety system; Colleges and universities that can reasonably supervise and manage public health on campus have fewer public health incidents and can establish a more sound public health safety system.

6. Research Conclusions and Suggestions

6.1. Research Conclusions

Based on the data of 256 questionnaires, using the correlation test and multiple Logistic regression model, this paper makes relevant research and analysis, and explores the influencing factors of the deficiency of public health security system in colleges and universities during the COVID-19 epidemic. Among the related factors, teachers' artificial factors and supervision and management factors are more significant. The ratio of the probability of fewer health safety incidents to the probability of more health safety incidents in universities that provide public health training and education to university teachers is 630,381,699 times that of universities that do not provide public health training and education to university teachers; The ratio of the probability of fewer health safety incidents to the probability of more incidents in universities where public health supervision and management are in place, It is 4.818 times of this ratio in colleges and universities that have not conducted public health training and education for college teachers.

6.2. Suggestions

6.2.1. Strengthen Public Health Safety Education and Training for Teachers in Colleges and Universities

Colleges and universities should improve the quality of teachers in schools. Equipped with trained teachers is the foundation and guarantee of public health safety. Teachers can not only teach, but also educate, not only impart students' academic knowledge, but also guide students to cultivate corresponding skills and correct ideas, including the knowledge about public health and safety. When teachers have certain knowledge about public health and safety, they will be able to incorporate public health and safety education into the teaching plan, and they will be able to carry out certain meaningful activities or lectures for students, such as holding public health and safety knowledge-related competitions on a regular basis, etc., which will change students' thoughts and behaviors in a subtle way. Improve students' awareness and ability to deal with public health safety incidents as much as possible.

6.2.2. Establish a Monitoring System for Prevention and Control in Colleges and Universities

As far as the epidemic period is concerned, we must do a good job in epidemic prevention. Starting from all aspects, we should resolutely do a good job in supervision and management in colleges and universities, and formulate relevant rules and regulations for public health and safety incidents. [3], form a comprehensive consciousness and maintain normal order. For example, each college should carry out a daily nail punching system, and assign specialized personnel to be responsible for testing and registering the temperature measurement. Make information registration for the personnel with abnormal temperature monitoring and report to the school epidemic prevention leading group, isolate the personnel in time and send them to medical treatment. Measures such as setting a table for one person or a rice noodle in the canteen, Be sure to wear masks on campus as required. Arrange staff to disinfect various areas in the school at designated points, and so on. Ensure that the monitoring and supervision system is strictly implemented from top to bottom.

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