2020 4th International Seminar on Education Innovation and Economic Management (SEIEM 2020)

Binary Logistic Regression Analysis of Tianjin University Students' Health Education Needs and Influencing Factors

Yueying Liang, Fang Yuan
Graduate school
Tianjin University of Traditional Chinese Medicine
Tianjin, China

Jian Zhang*
School of management
Tianjin University of Traditional Chinese Medicine
Tianjin, China
*Corresponding author

***Abstract*—The purpose of this article is to study the needs of college students for health education, so as to promote the development of college health education and improve the physical health of college students. We conducted a questionnaire survey on the health education needs of college students in ten universities in Tianjin, and used a binary logistic regression model to analyze the factors that affect the health education needs of college students from three dimensions: individual characteristics, health education content and health education form. Our results show that 82.36% of college students express a need for college students' physical health education. The college students' demand for health education is based on nutrition and diet knowledge, safe medication knowledge, infectious diseases (hepatitis, tuberculosis, influenza, etc.) prevention knowledge, AIDS knowledge, the launch of health education knowledge contests, and the establishment of health education counseling centers have significant positive correlations, and different factors have different degrees of impact on results. These results demonstrate that the vast majority of college students need health education. This study suggests that relevant government departments and universities should increase investment in health education for college students, provide personalized health education content based on the characteristics of college students, and dynamically adjust the form of health education for college students to meet the needs of college students for health education.**

Keywords—Health education; Needs; binary logistic regression

I. INTRODUCTION

Health education is an important part of national education. Most western countries include health education as a compulsory course in the syllabus of primary and secondary schools [1]. China's health education first appeared in the 1950s, and health education for college students in China began to be implemented in 1984 [2]. In recent years, through a survey of the physical and health conditions of students across the country, it has been found that the physical health of college students in China has deteriorated year by year, and some indicators are not even as good as those of middle school students[3]. With the continuous development of higher education in China, the proportion of college students among peers is increasing year by year, and college students are in the stage of concept and behavior formation and fixed development. Carrying out health education for college students is of great significance to the improvement of China's future population quality [4]. A meta-analysis result as of February 2015 shows that the health literacy level of Chinese college students is only 12.08%. According to previous studies, it is found that many college students in China have an unhealthy lifestyle. And many factors affect the healthy lifestyle of college students [5]. Through statistical analysis of relevant literature, it is found that most scholars in China have more research on college students' mental health education and higher quality, and less research on college students' physical health education. In addition, most colleges and universities have a single content and form of health education. Schools provide more education on college students 'mental health, AIDS, tuberculosis and other diseases, but less education on college students' lifestyle habits, sports and health, safe medication, and healthy sleep. Most forms of education are mainly about conducting knowledge contests, lectures, and courses, and the forms of education are relatively simple [6]. Therefore, this article mainly takes college students in Tianjin as an example to conduct a questionnaire survey on the physical health education of college students to understand the needs of college students for the content and form of health education. And the ultimate goal is to improve the physical fitness of college students.

II. DATA SOURCE AND SAMPLE BASIC CHARACTERISTICS

A. Data Sources

In this study, 10 undergraduate universities in Tianjin were used as the survey site, and a random questionnaire survey was conducted on college students. The content of the questionnaire involved three parts, namely basic information, health education content and health education form. A total of 2058 questionnaires were distributed, excluding missing questionnaires, repeated answers and invalid questionnaires that did not meet the requirements. 1687 valid questionnaires were retrieved, with an efficiency of 81.97% .The questionnaire collected is representative of the health education research of university students in Tianjin.

  DOI: 10.25236/seiem.2020.009

B. Basic characteristics of the sample

Among the 1687 valid questionnaires recovered, males accounted for 46.18%, females accounted for 53.82%, and the ratio of males to females was more coordinated. The proportion of non-medical college students was 53.53%, medical college students accounted for 46.47%. Per capita family college students with a monthly income of 2,000 yuan or less, accounting for 8.89%, college students with a per capita monthly income of 2001 to 4000 yuan, accounting for 30.17%, college students with a monthly per capita household income of 4001 to 5000 yuan, accounting for 25.37%, college students with a per capita monthly household income of 5001 yuan and above, accounting for 35.57%. Regarding the survey of college students' demand for health education, 79.08% of college students said that they needed health education for college students, and 20.92% of college students said that they did not need school health education for college students. Having received less health education for college students, 52.05% of college students said they had received more or very much health education content for college students during college.

III. MODELS AND VARIABLES

A. Model settings

The health education needs of college students studied in this paper refer to whether college students need health education. The survey found that college students' demand for health education is affected by a variety of factors, but it will eventually appear as two needs results of “need” and “no need”, which is a [0.1] binary classification variable, that is, college students’ demand for health education is discrete Selection problem, this paper chooses the probability model. The binary logistic model is an effective model for regression analysis of the explanatory variables as binary variables. The basic form of the logistic model is as follows:

$$P_j = \mathrm{F}\left(\beta_0 + \sum_{i=1}^{m} \beta_i X_{ij}\right) + u = \frac{1}{\{1+exp[-(\beta_0+\sum_{i=1}^{m} \beta_i X_{ij})]\}} + u \quad (1)$$

$$l_n \frac{P_i}{1-P_j} = \beta_0 + \sum_{i=1}^{m} \beta_i X_j \quad (2)$$

In the above two formulas, P_j is the probability of an individual occurring a certain behavior. j is the number of influencing factors. X_{ij} represents the j-th influencing factor of the i-th sample, i is the college student number; $X_j$represents the j-th influencing factor. $\beta_i$is the regression coefficient of influencing factors. m represents the number of influencing factors β_0 intercept term. u is the error term.

B. Variable selection and description

In this study, whether college students in Tianjin need health education is the explanatory variable, that is, the health education needs of college students in Tianjin are used as the dependent variable (y), with a value of 0 or 1, (whether health education is required, $y = 1$, and no is $y = 0$). The explanatory variables are mainly selected from Tianjin university student individual characteristic variables (X_p), health education content variables (X_n), and health education form variables (X_e), and each type of variable is divided into several variables, a total of 17 explanatory variables ($X_1, X_2, X_3, \ldots, X_{17}$). Taking the above factors as independent variables, the expression of constructing the econometric model of the health education needs of college students in Tianjin is:

$$y = \mathrm{F}(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14}, X_{15}, X_{16}, X_{17}) \quad (3)$$

TABLE I. DESCRIPTION OF MODEL VARIABLES

Variable type	*Variable name*	*Assignment definition*
Individual characteristic variables of college students X_p	genderX_1	male =0,female =1
	professionX_2	Non-medical =0, Medical =1
	Household monthly income per capita X_3	<=2000yuan=1,2001yuan-4000yuan=2,4001yuan-5000yuan=3,>=5000yuan=4
Health education content variables X_n	Nutrition and diet knowledge X_4	Very should not =1,Basically should not =2,Doesn't matter =3,Should be =4,Very much =5
	Sports and fitness knowledge X_5	
	Lifestyle X_6	
	Safe medication knowledge X_7	
	Healthy sleep knowledge X_8	
	Sexual knowledge X_9	
	Infectious disease prevention knowledge X_{10}	
	AIDS knowledge X_{11}	
Variables of health education X_e	Health Education Course X_{12}	Very should not =1,Basically should not =2,Doesn't matter =3,Should be =4,Very much =5
	Health Education Knowledge Contest X_{13}	
	Health education knowledge campus poster promotion X_{14}	
	School Official Account X_{15}	
	Campus radio X_{16}	
	Opened health education consultation center X_{17}	
Explained variable	Demand for health education y	No need =0,Need=1

TABLE II. THE STATISTICAL DESCRIPTION OF MODEL VARIABLES

Variable type	*Variable name*	*Minimum*	*Maximum*	*Mean*	*Standard deviation*
X_p	X_1	0	1	0.54	0.499
	X_2	0	1	0.46	0.499
	X_3	1	4	2.88	0.999
X_n	X_4	1	5	3.75	1.164
	X_5	1	5	3.81	1.182
	X_6	1	5	3.79	1.180
	X_7	1	5	3.92	1.157
	X_8	1	5	3.86	1.168
	X_9	1	5	3.86	1,168
	X_{10}	1	5	3.95	1.180
	X_{11}	1	5	3.98	1.172
X_e	X_{12}	1	5	3.85	1.155
	X_{13}	1	5	3.84	1.156
	X_{14}	1	5	3.83	1.155
	X_{15}	1	5	3.85	1.150
	X_{16}	1	5	3.84	1.182
	X_{17}	1	5	3.97	1.160

IV. RESULTS AND ANALYSIS

This paper uses SPSS23.0 Software to estimate the model, and uses Forward Stepwise (Conditional) method to perform regression test on the research samples. The results are shown in Table 3. Using Forward Stepwise (Conditional) method, the degree of contribution of variables to the explanatory power of the model can vary from the order before entering the model shows that only the variables within 5% of the significance level are listed in the model. From the results of the model, it can be seen that nutrition and diet knowledge X_4, safe medication knowledge X_7, infectious disease prevention knowledge X_{10}, AIDS knowledge X_{11}, campus education knowledge competition $X_{13}$and the establishment of a health consultation center X_{17} have a significant impact on the health education needs of college students. The variables that have not entered the model are gender X_1, specialty X_2, family monthly income per capita X_3, sports and fitness knowledge X_5, lifestyle habits X_6, healthy sleep knowledge X_8, sexual knowledge X_9, health education course X_{12}, health education knowledge poster promotion X_{14}, School public account X_{15} and campus radio X_{16}. The contribution of each variable to the explanatory power of the model in order from large to small: the establishment of health education consulting center X_{17}, knowledge of AIDS X_{11}, knowledge of nutrition and diet X_4, knowledge of safe medication X_7, knowledge of infectious disease prevention X_{10}, and knowledge of health education contest X_{13}.

A. *Analysis of the impact of health education content on college students' health education needs*

The nutrition and diet knowledge, safe medication knowledge, AIDS knowledge and prevention of infectious diseases (hepatitis, tuberculosis, influenza, etc.) in health education content have a significant impact on the health education needs of college students. Nutrition and diet knowledge (X_4 regression coefficient of 0.183), safe medication knowledge (X_7 regression coefficient of 0.148), infectious disease (hepatitis, tuberculosis, influenza, etc.) prevention knowledge (X_{10} regression coefficient of 0.133) and AIDS knowledge (X_{11} regression The coefficient is 0.191), which is positively correlated with the health education needs of college students at the 0.05 level. According to the survey, 67.58% of college students need knowledge of nutrition and diet, 73.68% of college students need knowledge of safe medication, 74.04% of college students need knowledge of infectious disease (hepatitis, tuberculosis, influenza, etc.) prevention, and 3.33% of college students need knowledge of AIDS. This shows that college students attach more importance to the above four health education content. College students are a relatively sensitive social group with high knowledge quality, higher requirements for physical health, and more attention to physical health. This shows that the model is consistent with the actual situation.

TABLE III. THE REGRESSION RESULTS OF THE BINARY LOGISTIC MODEL THAT AFFECTS THE HEALTH EDUCATION NEEDS OF COLLEGE STUDENTS

Project	***Explanatory variables***	***Model approach (Forward Stepwise)***			
		B	Wald	Sig.	Exp(B)
X_n	X_4	0.183	10.514	0.001	1.201
	X_7	0.148	6.509	0.011	1.159
	X_{10}	0.133	5.646	0.017	1.142
	X_{11}	0.191	11.049	0.001	1.21
X_e	X_{13}	0.132	5.343	0.021	1.141
	X_{17}	0.253	20.367	0.000	1.288
constant		1.329	493.369	0.000	3.779
Overall model test		Prediction accuracy 79.10%			
		-2 log-likelihood 1541.589			
		Cox$Snell R2 0.106			
		Nagelkerke R2 0.165			
		Chi-square test value 54.055			

B. *Analysis of the impact of health education on college students' health education needs*

In the form of health education, the development of health education knowledge contests and the establishment of health education consulting centers have a significant impact on the health education needs of college students. According to the results of the binary logistic regression model, the two health education forms of health education knowledge competition (X_{13} regression coefficient is 0.132) and health education consultation center (X_{17} regression coefficient is 0.253) are established. Demand is positively correlated. According to the survey results, 68.70% of college students indicated that they needed to launch a health education knowledge contest, and 74.75% of college students indicated that they needed to open a health education consultation center. College students prefer to understand health knowledge through knowledge contests. When they have health problems, they hope to obtain information in the form of consultation and question and answer, and meet their health needs promptly. This shows that the model is consistent with the actual situation.

V. CONCLUSION

This study used random questionnaire survey data from college students in ten universities in Tianjin to analyze the influencing factors of college students' health education needs and the college students' demands for health education content and forms of health education. The results showed that college students 'health education needs and nutrition diet knowledge and safety Factors such as medication knowledge, infectious diseases (hepatitis, tuberculosis, influenza, etc.) prevention knowledge, AIDS knowledge, health education knowledge competitions, and the establishment of health education counseling centers are positively correlated, with P values of less than 0.05, which are statistically significant and different factors The degree of influence on the results is different. Combined with the actual article, the following suggestions are given:

A. *Increase investment in health education for college students*

The investment includes human, material and financial resources. Universities should increase financial support, increase the number of health education service teams, and increase the ratio of numbers. Universities should improve supporting facilities related to health education, such as the establishment of offline health education consulting centers, the establishment of online official public accounts, the establishment of publicity boards and television stations in schools.

B. *Provide personalized health education content*

Universities should provide personalized health education content based on the characteristics of college students. Colleges and universities should guide students to fill in the questionnaire developed by the school according to their conditions before receiving education, and push the health education content they need according to their characteristics to meet the needs of college students for different health education content.

C. *Dynamic adjustment of college students' health education*

Relevant education departments should dynamically adjust the form of health education for college students in accordance with the development of the times. Colleges and universities should make full use of modern information technology, and a health education consulting center combining online and offline should be established. Online health education can provide convenient, fast, efficient and privacy-maintaining health education services, and offline health education can provide real, Accurate, communicative and interactive health education services that meet the various needs of college students.

ACKNOWLEDGMENT

We would like to express our heartfelt thanks to all those who participated in the questionnaire.

REFERENCES

[1] Tian X Y, Cheng Y L. Basic Theory and Practice of Health Education and Health Promotion [M] Beijing: People ’s Medical Publishing House, 2016,pp. 1-2.(In Chinese)

[2] Dong C L. Exploration and practice of health education for college students [J]. China Medical Education Technology, 2016, vol. 30(06), pp. 735-737. (In Chinese)

[3] Zhang Y, He L. Dynamic analysis of the health status of Chinese adolescents—Based on the data of four national physical health monitoring from 2000 to 2014 [J]. China Youth Research, 2016. vol. 06, pp.5-12. (In Chinese)

[4] Xu L N, Li H S, Wang Y, etc. Analysis of the status and influencing factors of health literacy among college students in Beijing in 2016 [J]. Prevention and Control of Chronic Diseases in China, 2019, vol. 27 (08), pp.601-605. (In Chinese)

[5] Zhao Y Y, Zhang Y Y, Bai X, etc. Meta-analysis of the health literacy level of Chinese college students [J]. Chinese Journal of Disease Control, 2016, vol. 20 (03), pp. 290-293 +298. (In Chinese)

[6] Wang Y Y. Current situation and thinking of college students ’health education [J]. China Health Education, 2018, vol. 34 (06), pp. 573-575. (In Chinese)