Analysis and research on mental health of college students based on cognitive computing

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Abstract

In recent years, according to the survey, college students have frequent psychological problems, anxiety, depression, inferiority, interpersonal sensitivity and other psychological problems, and even more, even the idea of suicide. It has a very serious negative impact on the family and society. Children are the flowers of the motherland, and college students are the important cornerstone of the country's future development. Therefore, the mental health problems of college students are particularly important. Based on the research of cognitive computing, this paper combines the research data to analyze the influencing factors of mental health, analyzes the shortcomings of mental health education, and proposes corresponding ideas and solutions.
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1. Introduction

According to the survey report of the Institute of Psychology of the Chinese Academy of Sciences, the overall mental health of Chinese urban residents is generally good, but about 20% of respondents have mental health problems (Zorzi et al., 2015). At the same time, a survey conducted by the China Youth Daily revealed that about 60% of college students currently have psychological problems. According to the situation, about 17% of students have different degrees of depression. About 15% of college students suffer from anxiety disorders, about 10% of students have varying degrees of pessimism, and about 10% of students have hatred against society and families (see Fig. 1).

With the rapid development of the social economy, these different levels of psychological problems are also intensifying. In addition, some scholars have shown that the mental health status of the 18–28 age group is mostly low, and the number of adolescent mental health indicators participating in the test is significantly reduced. These psychological problems have slowly penetrated into every aspect of the student's daily life. Due to factors such as family, school, personality, social environment and even teacher-student relationship, there are still many psychological problems among college students. First of all, students with mental health problems have low learning efficiency, poor grades, and many students have serious problems (Zhang, xxxx). These phenomena will increase the psychological problems of students; anxiety in work will also lead to inefficient work and affect the progress of work; in dealing with people, there will be indifference and fear of contact with people. In recent years, a series of accidents in colleges and universities have been caused by mental health problems.

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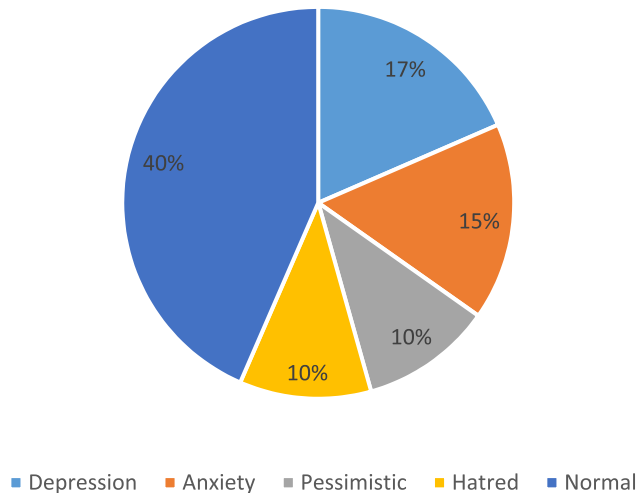
Mental health status ratio

Fig. 1. Status of mental health status of college students in China.

These incidents all point to the fact that the mental health of college students is very serious. Therefore, it is of great significance to strengthen the investigation of college students' mental health and to study the factors affecting college students' mental health.

2. The factors affecting college students' mental health

At present, the reality of mental health education for college students in China is not optimistic, and there are mainly problems in the following aspects.

2.1. The concept is backward and the understanding of psychological problems is insufficient

Many college students believe that only those so-called "psychiatric patients" need mental health education and necessary psychological treatment, and mental health is "governing mainly, treating and focusing on prevention". If there is no psychological problem, there is no need for mental health education. Therefore, I refuse to ideological education in this area. And once there is a psychological problem, I am ashamed to ask for help, and I am afraid that I am considered to be different from ordinary people. At the same time, some students wear colored glasses, and they are excluded from students who have psychological problems and seek help. These are not conducive to mental health development (Fuzhen, 2002).

2.2. Mental health education is not formal and management is not standardized

Although in recent years, in the face of the increasingly serious psychological problems of college students and the actual situation that jeopardizes the family and society, colleges and universities have begun to pay attention to the education of college students. Some colleges and universities also try to implement some measures for college students' mental health education, but most colleges and universities do not understand the mental health education deeply enough, just formalism. Even though many schools try to promote the mental health education of college students, they have not taken effective measures, which has led to mental health education still in the stage of slogan publicity (Zhong & Qiu, 2012).

2.3. The educational teachers' knowledge level is not up to standard, and there is a lack of professional communication teacher team

At present, this problem is highlighted in two aspects. First, the number of personnel is insufficient and the teachers are weak. The mental health education personnel in colleges and universities in China are seriously inadequate, which restricts the healthy development of mental health education in colleges and universities (Hinton et al., 2012; Yao & Lu, 2007). Second, professional talent resources are not enough. Therefore, the quality and effectiveness of mental health education are largely unable to meet expected expectations. Second, counselors are the most accessible school administrators in their daily lives, and they are the bridge between schools and students. However, most counselors lack the basic knowledge and main skills of mental health education, which affects the final result of mental health education.

2.4. The irregularity of the lifestyle of college students

At present, many college students are extremely irregular in their daily lives, often eating irregularly, and often staying up late may be caused by the popularity of the Internet and the excessive pressure of college students' daily learning. These bad habits will cause great harm to their body and mind. Recent studies have shown that the lifestyle of college students is moderately positively correlated with their mental health, thus showing a strong relationship between lifestyle and mental health. Interactive contact. Moreover, so far, few people have raised the impact of students' health cognition on mental health. It is not clear that the impact of students' health cognition on the mental health of college students is still in a state of ambiguity (Kang, 2014) (see Fig. 2).

3. Based on cognitive computing research and analysis

Cognition is the complete process of human observing the world, understanding the world, and transforming the world (He, Xiang, Kang, Wang, & Pan, 2016). "Ci Hai" interprets "cognition" as the activity of human beings to understand objective things and acquire knowledge, including perception, memory, learning, speech, thinking and The process of problem solving is the process of people actively processing external information. Cognitive com-

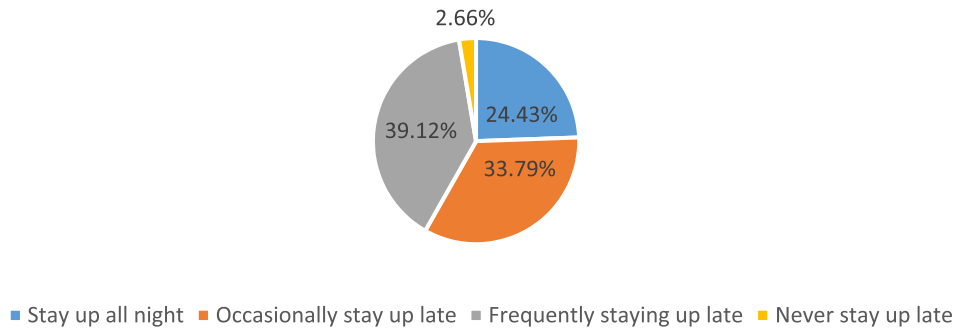The proportion of college students staying up late

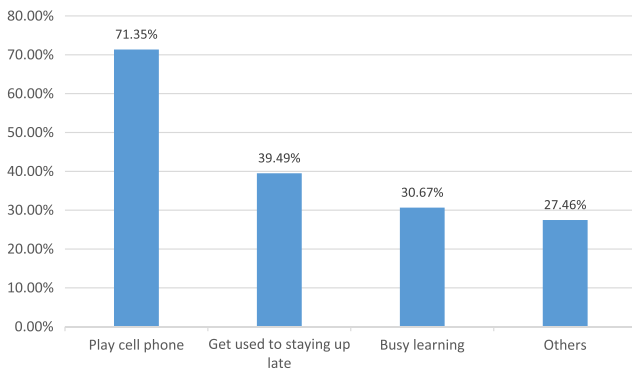Fig. 2. The proportion of college students staying up late.

Fig. 3. Reasons for college students staying up late.

puting, as an extension of cognition, is a top-down, global, unified theoretical study designed to explain the observed cognitive phenomena (thinking), consistent with known bottom-up The neurobiological facts (brains) can be calculated or explained by mathematical principles (Wang & Zheng, 2011). It seeks a software and hardware component that conforms to the well-known computer science class with brain neurobiology and is used to process mental processes such as perception, memory, language, intelligence, and consciousness.

As the basic unit of cognitive cognition, it is an independent and complete cognitive element. It can express some information of the external world, expressed in the form of x(ax), y(ay), z(az), etc.; where x, y, z are the attributes of the cognitive element, indicating the cognitive element itself. The nature; a is between the intervals (0, 1), thus indicating that the information belongs to the range of x, y, z, called the membership degree, which is automatically determined by the human sensory organ according to the degree of the attribute state of the cognitive element. If the membership degree of a cognitive element is $0 < a < 1$, the cognitive element is called a fuzzy cognitive element; if the membership degree of a cognitive element is $a \equiv 1$, the cognitive element is called Accurate cognitive elements. Among them, the fuzzy cognitive element whose membership degree a is infinitely close to 1 is called ideal cognitive element (Kleanthis, Marios, & Costas, 2011), which is denoted as $\bar{x}(1)$, $\bar{y}(1)$, $\bar{z}(1)$.

Experiments show that human cognitive environment has more unknown fuzzy information besides some accurate information. Therefore, human sensory organs are both accurate information sensors and fuzzy information sensors (Chen, Li, Narayan, Subramanian, & Xie, 2016), so cognitive elements it is an effective expression of human cognitive information.

If a finite number of cognitive elements $x_1(a_{x1})$, $x_2(a_{x2})$, ..., $x_n(a_{xn})$ are combined, they can interact to form a new cognitive element y(ay), which is called a one-dimensional fuzzy event, denoted as $e = [x_1(a_{x1}), x_2(a_{x2}), ..., x_n(a_{xn})] \rightarrow y(a_y)$, $(n \geq 2)$, $x_i(a_{xi})$ is called the e element of e, $y(a_y)$ The knot called e, n is called the dimension of e, and is called de = n. Therefore, when a certain one-dimensional fuzzy event occurs in the external world at a certain time, it will definitely cause human cognition, and then calculate it as recognition (Ling, 2012).

When the calculation is complete, we use the average method in the initial algorithm to generate the initial cognitive data (Hinojosa, Nefti, & Kaymak, 2011), that is, when a certain unary fuzzy event $e = [x_1(a_{x1}), x_2(a_{x2}), ..., x_n(a_{xn})] \rightarrow y(a_y)$, $(n \geq 2)$ When the occurrence occurs, the mean value of the membership of all the essential elements of the unary fuzzy event is sa, $sa = \sum ax_i$, and the contribution of the necessary attribute is added to the generated knowledge. When $bxi = axi/sa$, the initial knowledge of the generated is $cp = f[x_1(a_{x1}/sa), x2(a_{x2}/sa), ..., x_n(a_{xn}/sa)]/1 \rightarrow y(1)$. Subsequently, we need to use the input recognition decision method in the algorithm of subsequent recognition, that is, when a certain unary fuzzy event $e = [x_1(a_{x1}), x_2(a_{x2}), ..., x_n(a_{xn})] \rightarrow y(a_y)$, $(n \geq 2)$ occurs, assuming that there is already an associated recognition $cin = f[x_1(b'_{x1}), x_2(b'_{x2}), ..., x_n(b'_{xn})]/m \rightarrow y(1)$, that is, associative cognition is input cognition, and input cognition is an existing knowledge in human civilization. Therefore, the unary fuzzy event $e = [x_1(a_{x1}), x_2(a_{x2}), ..., x_n(a_{xn})] \rightarrow y(a_y)$, $(n \geq 2)$ will have no effect on this understanding, and the contribution of all necessary meta-attributes will remain unchanged (Katrin, Katrin, & Stefan, 2012), resulting in The generated successor is $cs = f[x1(bx1'), x2(bx2'), ..., xn(bxn')]/0 \rightarrow y(1)$.

Through the above cognitive calculation method, the data impact analysis will be used to analyze the important influencing factors affecting the mental health of college students.

At present, in the research on mental health education of college students in China, there are three kinds of commonly used measurement tools: the "Carter 16 Personality Factor Measurement" (16PF), the Symptom Self-Assessment Scale (SCL-90) and College Student Personality Questionnaire (UPI). The research methods used in this paper mainly use the Symptom Checklist 90 (SCL-90), the Social Rating Scale and the Health Cognitive Questionnaire (HCQ-127). The SCL-90 uses the Self-Assessment Scale for Physical and Mental Symptoms (SCL) prepared by Derogatis. −90) Identify the mental health status of the subjects (Hinojosa et al., 2011). The scale is mainly based on three aspects of mental state (Fig. 3). It consists of 90 items, 10 dimensions, 5 grades, high scores, low mental health and high credibility. And validity. The Health Cognitive Questionnaire consists of 127 items, including seven cognitive dimensions, covering sports cognition, fitness cognition, psychological cognition, sleep cognition, health cognition, nutritional cognition, and health cognition. Using right and wrong scores, high scores and high levels of health awareness. The SPSS test showed that the semi-trust coefficient of the questionnaire reached a significant level of 0.8802, and the structural validity coefficient was a good level of 0.691 (Su, 2011) (see Fig. 4).

3.1. Information and methods

3.1.1. Survey respondents

Survey respondents: Students from two countries were selected as pilots. Each country selected two groups, the first of which was China. The first group was the first group of the first grade of a university in central China. The first group, the second group It is two classes in the first grade of a university in China's coastal areas. These two groups are used as experimental groups. The second group is the United States. The first group is the first class of two universities in the coastal cities of the United States as the control group, and the second group is the control group. The second group is A class of 2 students in the first grade of a university in the central United States. These two groups are rented for comparison. Each group consists of 80 people, aged between 19 and 21, with a similar proportion of boys and girls. Four groups of students were tested by SCL-90, Health Cognitive Questionnaire and Social Support Scale before the experiment, showing no significant difference between the two groups (see Tables 1–3).

3.1.2. Calculation method

According to the psychological status of college students, SCL-90, social rating scale and health cognition questionnaire (HCQ-127) were selected as the evaluation indicators of psychological intervention effect. Using cognitive psychology, from the interaction of cognition, emotion and behavior, design and arrange a variety of activities to engage students in cognitive education intervention, that is, each cognitive activity education is set to a certain group of similar one-dimensional fuzzy events. Then, a set of similar unary fuzzy events appearing in the order of investigation time and a last task associated with the set of unary fuzzy events constitute an event-task flow, denoted as $e1 \rightarrow e2 \rightarrow \ldots \rightarrow ep \rightarrow wi$. An input cognition and an associated task appearing in chronological order constitute an cognition-task flow, expressed as $cin \rightarrow wq$, to derive knowledge. Data is derived from the cognitive computing process (Qian, 1998) (see Fig. 5).

3.1.3. Statistical methods

Data were collected using SPSS 17.0 software. The measurement data were expressed as ($\bar{x}\pm s$), t test was used, and multiple factors were analyzed by logistic analysis, $P < 0.05$. The difference was statistically significant.

3.2. Results

3.2.1. Comparison and analysis of the results on the mental health scale before and after the intervention of the experimental group and the control group

From the results in Table 1, it can be concluded that the scores of the SCL-90 factors in the experimental group are slightly lower than the US scores, and there are significant differences in the three project factors such as coercion, depression and anxiety. There are very significant differences in the changes. Compared with the first group of data in the experimental group, there was a slight decrease in the number of positive items, compulsion, depression and anxiety, but the difference was still obvious, indicating that the more developed areas would lead to an increase in the number of positive items, coercion, and depression and anxiety. The difference between the first group of data and the second group of data in the control group was not obvious. It shows that different regions of the same country have no significant influence on the pain level of the three factors of coercion, depression and anxiety, and have a good effect on the mental health of college students.

3.2.2. Comparison and analysis of the results of the coping style questionnaire before and after the intervention of the experimental group and the control group

The results in Table 2 show that the positive group of the experimental group has a higher value than the first
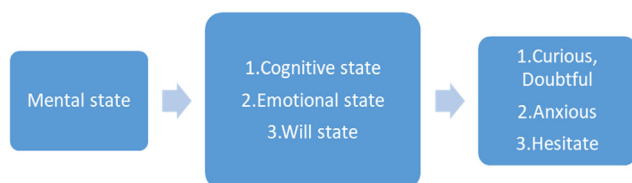

Fig. 4. Schematic diagram of the psychological state research content.

Table 1
Comparison of SCL-90 data between experimental group and control group ($\bar{x} \pm s$).

Factor		Test Group	Control Group	t
Positive Item	First group	23.10 ± 12.33	31.00 ± 16.55	−2.57[*]
	Second Group	31.44 ± 15.99	31.10 ± 16.20	0.040
	t	−2.75[**]	−0.12	
Somatization	First group	1.20 ± 1.32	1.32 ± 0.44	−1.42
	Second Group	1.31 ± 0.50	1.35 ± 0.48	0.16
	t	−1.33	0.17	
Force	First group	1.63 ± 0.63	1.90 ± 0.90	−2.28[*]
	Second Group	1.86 ± 0.59	1.84 ± 0.52	0.14
	t	−2.10[*]	0.48	
Interpersonal Relationship	First group	1.57 ± 0.61	1.74 ± 0.71	−1.66
	Second Group	1.76 ± 0.64	1.80 ± 0.67	−0.65
	t	−1.71	−0.51	
Depression	First group	1.48 ± 0.46	1.66 ± 0.64	−2.10[*]
	Second Group	1.70 ± 0.62	1.71 ± 0.67	−0.21
	t	−2.12[*]	−0.26	
Anxiety	First group	1.41 ± 0.35	1.59 ± 0.62	−2.28[*]
	Second Group	1.52 ± 0.52	1.55 ± 0.56	0.05
	t	−2.18[*]	0.42	
Hostility	First group	1.44 ± 0.62	1.49 ± 0.51	−0.25
	Second Group	1.55 ± 0.60	1.50 ± 0.63	0.71
	t	−0.92	−0.06	
Terror	First group	1.32 ± 0.47	1.35 ± 0.45	−0.50
	Second Group	1.44 ± 0.57	1.45 ± 0.66	−0.28
	t	−1.30	−1.18	
Paranoia	First group	1.40 ± 0.44	1.52 ± 0.50	−0.98
	Second Group	1.50 ± 0.40	1.55 ± 0.59	−0.53
	t	−0.78	−0.26	
Psychotic	First group	1.37 ± 0.39	1.35 ± 0.46	−0.24
	Second Group	1.46 ± 0.50	1.50 ± 0.41	−0.19
	t	−1.46	−1.54	

Note:
[*] $P < 0.05$.
[**] $P < 0.01$ (the same below).

Table 2
Comparison of first group t and second group differences in coping style questionnaires between experimental group and control group ($\bar{x} \pm s$).

Factor		Test Group (n = 80)	Control Group (n = 80)	t
Positive dimension	Post test	2.56 ± 0.44	1.88 ± 0.29	2.10[*]
	Pretest	1.85 ± 0.39	2.00 ± 0.37	−0.73
	t	2.46[*]	−0.55	/
Negative dimension	Post test	1.31 ± 0.42	1.43 ± 0.45	−1.42
	Pretest	1.55 ± 0.38	1.45 ± 0.42	0.24
	t	−2.23[*]	−0.56	/

group and the first component of the control group. The negative set of the first set of values is lower than the second set. There was no significant difference in the difference between the first group and the second group of the control group. It shows that cognitive education in different regions of the same country can affect students' coping styles. The students in the experimental group have more choices such as "communicating with others, learning to listen to others' opinions, and trying to change their own

shortcomings" in the face of setbacks and difficulties. Reduced negative responses through poor methods.

3.2.3. Comparison and analysis of results on the social support scale before and after intervention in the experimental group and the control group

The results in Table 3 show that the first group of the social support total score, subjective support and support utilization rate of the experimental group is higher than

Table 3

Comparison of first group t and second group differences in social support rating scales of experimental and control groups ($\bar{x}\pm s$).

| Factor		Test Group (n = 80)	Control Group (n = 80)	t
Total social support score	Post test	34.18 ± 4.40	32.06 ± 4.82	2.48[*]
	Pretest	32.10 ± 4.76	32.36 ± 4.66	−1.78
	t	2.40[*]	−0.33	
Subjective support	Post test	17.53 ± 2.65	16.44 ± 2.97	2.15[*]
	Pretest	16.31 ± 2.62	16.70 ± 2.91	−0.80
	t	2.58[*]	−0.50	
Objective support	Post test	18.74 ± 1.48	8.61 ± 1.54	0.41
	Pretest	8.89 ± 1.51	8.63 ± 1.44	0.50
	t	−0.20	−0.11	
Support utilization	Post test	7.95 ± 1.93	7.09 ± 1.95	2.45[*]
	Pretest	7.17 ± 1.90	7.01 ± 1.90	0.34
	t	2.23[*]	0.93	
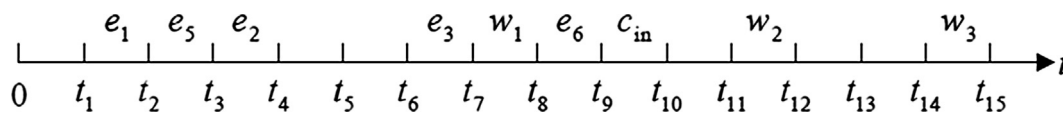
Fig. 5. Cognitive calculation process example.

the second group value, and is significantly higher than the first group value of the control group. The numerical value of objective support is not obvious. There was no significant difference between the first group and the second group in the control group. It shows that cognitive education can improve the emotional support of students' subjective experience and the utilization of social support.

3.2.4. Correlation analysis of the relationship between health cognition level and mental health level

The results in Table 4 show that the relationship coefficient between the 10 factors of health cognition and mental health of college students is mainly between 0.5625 and 0.8067. The coefficients of health cognition and interpersonal factors, depression factors and anxiety factors are as high as 0.7504, 0.7943 and 0.8067, respectively. It is highly positively correlated, and the other is moderately positively correlated (see Table 4), further indicating that the 10 factors of college students' health

cognition and their mental health are moderately and positively correlated, and the overall positive health is reflected. The higher the level of cognition, the higher the level of mental health, and vice versa, the lower the level of mental health.

3.2.5. Summary

In summary, compared with different countries, more developed areas will make students' psychological problems more serious, which will lead to students' depression, anxiety and other psychological problems, but at the same time, they will improve the students' psychological quality and withstand them. Bigger setbacks and pressures. In the less developed areas, students have less access to things and outsiders have less influence on them, so they only need to concentrate on their studies. Therefore, they rarely have psychological problems such as depression and anxiety, but because they experience fewer things, they are less able to withstand psychological stress.

Table 4

Partial correlation matrix of health cognition and mental health factors.

	Body	Forcing	Interpersonal	Depression	Anxiety	Hostility	Horror	Extreme	Spirit	Other
Somatic factor	–									
Forced factor	0.2581	–								
Interpersonal factor	0.2580	0.5260	–							
Depression factor	0.2873	0.4966	0.5670	–						
Anxiety factor	0.4536	0.4610	0.5861	0.6037	–					
Hostility factor	0.2944	0.4135	0.4286	0.5070	0.5412	–				
Terror factor	0.2815	0.3038	0.4374	0.4508	0.3893	0.2781	–			
Bias factor	0.2445	0.2498	0.4297	0.3942	0.4149	0.3976	0.3198	–		
Mental factor	0.2946	0.1976	0.4170	0.4785	0.4566	0.3381	0.3711	0.5465	–	
Other factors	0.3866	0.2988	0.3109	0.4837	0.4470	0.4496	0.3199	0.3893	0.3879	–
Health cognition	0.5625	0.6355	0.7504	0.7943	0.8067	0.6540	0.5801	0.5949	0.6512	0.6301

4. Ideas and countermeasures for college students' psychological health education

4.1. Open a mental health education course to enable college students to correctly understand and face up to psychological problems

In order to improve the self-cognition ability of college students, colleges and universities should provide professional mental health education courses according to actual needs. Help college students face up to psychological problems, fully understand themselves, find the right way to quickly adapt to the university's learning and living environment. In addition, colleges and universities should regularly carry out psychological education publicity lectures, invite experts and scholars in the field of psychological education to popularize educational knowledge, organize psychological education-related activities, and involve students. Through this system, students are guided to correctly solve various problems encountered in daily life, and actively guide them to fully understand their psychological development, master scientific demobilization methods and psychological adjustment methods. Minimize the unstable factors of college students' psychological behavior, reduce the possibility of campus disharmony, and achieve the purpose of improving college students' self-cognition and self-regulation ability. Thereby creating a safe and harmonious campus environment for college students (Su, 2016).

4.2. Create a good family atmosphere, social environment and network environment

To effectively solve the mental health problems of college students, in addition to starting from campus life, we must also pay attention to the family environment of students. As the closest contact with students, their own quality and family environment have a very important impact on college students' mental health education. Therefore, teachers should maintain long-term contact with parents. Instill the correct values of thought into the parents of the students so that they can influence and educate their children and establish a correct outlook on life, world views and values. Thereby achieving the purpose of guiding their mental health development. At the same time, social environment and network environment issues, strengthen students' self-management and self-monitoring ability, colleges and universities actively start psychological education activities, popularize laws and regulations, and through these activities, infiltrate mental health concepts and legal awareness into campus culture, college students' mental health self The awareness of self-cultivation and self-management has been enhanced to a greater extent.

4.3. Actively advocate healthy living for students

To effectively solve the physical health problems of college students, it is necessary to guide them to form a scientific and standardized living habits. Therefore, first of all, the school teachers should actively carry out a number of sports activities, encourage students to actively participate, and carry out various lectures and activities to make students aware of the seriousness of health problems. At the same time, the school should also regularly allow students to participate in various medical examinations to prevent the occurrence of health problems (Tompson, Jain, LeCun, & Bregler, 2014).

5. Conclusion

Based on the above, combined with the current situation of college students' mental health education, through cognitive calculation, analyze the factors affecting mental health education, and propose corresponding solutions. It is hoped that continuous progress will be made in this field. From the perspective of care and guidance, it will better serve the mental health of college students, guide students to establish a correct outlook on life and values, create a harmonious campus culture, and cultivate the complex talents needed by the society (Milton, Muhlert, & Butler, 2011). Country's future development has made important contributions.

Conflict of interest

The authors declare that there is no conflict of interests regarding the publication of this article.

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