



**ARTICLE**

# A Study on the Improvement of Mental Health Status of Teachers' Occupational Stress and Chronic Anxiety under Aerobic Exercise Alternative Activities

Sanyou Yan<sup>1,\*</sup> and Huaqing Yan<sup>2</sup>

<sup>1</sup>College of General Education, Minnan Science and Technology University, Quanzhou, 362332, China

<sup>2</sup>College of Business, Minnan Science and Technology University, Quanzhou, 362332, China

\*Corresponding Author: Sanyou Yan. Email: yansanyou@mku.edu.cn

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## ABSTRACT

The purpose of this study is to observe the occupational stress and chronic anxiety of college teachers and to carry out alternate activities of aerobic exercise to improve their mental health, the participants are 214 teachers from three universities in Yunnan Province, China. The results show that before the experiment, the overall situation of college teachers' occupational stress and chronic anxiety is at a high level, while after the experiment, the occupational stress and chronic anxiety of college teachers are significantly relieved. In terms of gender, male teachers have higher occupational stress and chronic anxiety than female teachers before the experiment, and both have a good alleviating effect after the experiment. In terms of length of teaching, teachers with teaching experience of 1–5 years before the experiment have the highest levels of occupational stress and chronic anxiety, followed by teachers with 6–10 years, and finally teachers with more than 10 years. After the experiment, the occupational stress and chronic anxiety of teachers in the three length of teaching groups are significantly reduced to the medium level. In terms of professional titles, the teachers with the titles of teaching assistant and lecturer before the experiment have higher occupational stress and chronic anxiety than those with the titles of associate professor and professor. After the experiment, both of them are significantly reduced to the medium level. Therefore, the impact of aerobic exercise alternate activities on college teachers has a positive improvement effect, which can effectively promote the mental health of college teachers and alleviate the negative situation at work.

## KEYWORDS

Sports; teachers' mental health; occupational stress; chronic anxiety

## 1 Introduction

Since the 20th century, the threat of stress and anxiety and the negative influence of emotion have been gradually refined and found. At the same time, with the rapid development of social economy, the accelerating pace of society, the increasingly fierce competition, and the crowd experience rate of stress and anxiety is also gradually increasing. A survey report on anxiety in China Youth Daily [1] shows that 34% of people often experience stress and anxiety, 62.9% of them experience these situations occasionally, and only 0.8% of people think they have no anxiety. Compared with five years ago, 47.8% of people feel that their anxiety and stress are gradually increasing, 31.5% of people feel that there is not much change, and 12.2% of people feel that it has eased. In Korea National Statistical Promotion Agency



[2], the proportion of people over 15 years old who feel stress in their overall living conditions has increased to 55.2% compared with 54.3% in 2014, which also implies that anxiety and stress have become a normal life of modern people.

On the other hand, it is precisely because of this rising trend of stress and anxiety that the traditional research categories of stress and anxiety can no longer meet the emerging needs of specific groups of people, so a developmental theory based on the original stress and anxiety theory has emerged to supplement and improve more blanks, among which the pressure and anxiety of teachers is one of them. Because teachers are bound to experience relevant work pressure in the process of performing their duties, which has a negative impact on teachers in varying degrees at the physical, psychological and behavioral levels, like other occupational pressures, teachers' work pressure will also reduce teachers' enthusiasm for work, experience psychological exhaustion, become gradually indifferent to work tasks and teaching objects, produce negative professional attitude and negative self, and eventually lead to higher willingness to leave. However, the psychological consumption of teachers is not only related to the organizational performance and reputation of the school, but also related to the academic achievement of students. Wei's [3] study conducted a survey on the stress and anxiety levels of middle school teachers. The detection rate of stress and anxiety among middle school teachers is 19.59%, and the average scores are all at a high level. The keywords for the most serious groups are female, middle-aged, married, teachers with middle and high professional titles, teachers with low educational background, head teachers, teachers in graduating class, working for more than 9 h. Chen's research [4] pointed out that teachers' anxiety and excessive psychological stress lead to many teaching problems, disturb normal work and life, and become a psychological disorder. The first affected group is the student group. If teachers are in the face of chronic anxiety for a long time, the student group taught may also be in a high level of chronic anxiety.

The pressure and anxiety of college teachers are usually manifested in the heavy teaching tasks, the promotion of academic qualifications, the promotion of professional titles, the conflict between higher role expectations and lower social status, etc. Different from primary and secondary school teachers, the main stressors of college teachers usually have additional specificity, which is related to the work tasks of college teachers. College teachers will develop in three main aspects: scientific research, contribution and return, and treatment. Therefore, there will be related problems such as workload, teaching resources and organizational limitations, interpersonal conflict and so on. Fisher [5] conducted a study on two universities in Scotland, and the results show that college teachers need to play a variety of roles, so that occupational stress and anxiety are complex and diverse, and the main stressor is academic research, followed by time constraints, interpersonal relationship, etc. Adams [6] believed that the continuous changes of school system and academic system are also bringing more negative effects on teachers, especially scientific research and promotion and time management. These situations are restrictive and competitive to young teachers. Therefore, the stress and anxiety of college teachers are not only full of teaching tasks, interpersonal relationships and salary factors like other teachers, but also contain more elements of scientific research and self-development direction, some researchers have also made research and suggestions for improvement. Cai's [7] research improved the stress and anxiety of college teachers by organizing social activities. The college teachers in the experimental group effectively reduced their negative emotions and sense of stress through regular social activities for one month, and also improved their job satisfaction. Liu [8] made a strategy for alleviating the pressure of university teachers, suggesting that schools should provide more promotion space for young teachers, encourage both teaching and scientific research, give more participation rights to teachers in school activities and set up relevant institutions to help teachers.

In fact, there are still few literatures on the research of college teachers' stress and anxiety, especially on the improvement of college teachers' stress and anxiety or their mental health. Most of them are the research on anxiety and stress of students and middle school teachers, which includes not only the research on

investigation and current situation, but also the research on improvement. Among them, there are many improvement experiments on sports, Yang [9] conducted a study on 60 middle school students to alleviate anxiety through fun basketball activities, and divided them into a control group and an experimental group. Among them, the experimental group received 12 weeks of daily fun basketball training, while the control group did not carry out activities. The results showed that the depression index of the experimental group not only improved significantly, but also had a higher improvement effect than the control group, which proved that basketball is a sport that can alleviate depression and anxiety of young people. He [10] conducted an experiment on 45 university teachers. The results showed that the stress of teachers decreased significantly after Latin dance training, and the types of Cha Cha and Rumba had a more significant effect on teachers' psychological improvement.

Through the above research, we can see that sports have a positive effect on the physical and mental health of different groups, and because university teachers will experience long-term stress and anxiety not only in teaching, scientific research and promotion, and there are relatively few research literatures on the improvement of mental health of university teachers. In addition, it is difficult for university teachers to spend more time on their own health and life, and for current university teachers, there is a certain imbalance between self-development and promotion and salary, that is, in addition to adapting to the internal environment of work, policy changes, performance appraisal and scientific research requirements are related to teachers' self-development. Therefore, the salary of the university also determines whether university teachers can adapt and develop well under these factors, however, in the process of long-term adaptation and development, in addition to the occupational pressure of interpersonal relationship, self-development and workload, university teachers will also suffer from long-term chronic anxiety in academic research work and academic cost burden. On this basis, the purpose of this study is to verify the alleviation effect of alternating aerobic exercise consisting of three daily activities of jogging, swimming and cycling on the long-term occupational stress and chronic anxiety of college teachers. In addition to improving more relevant physical therapy theories, it mainly highlights the importance of mental health problems of college teachers, and verifies that long-term diversified sports can alleviate the diversified chronic anxiety and stress of college teachers. To this end, this study sets up the following research questions. First, the comprehensive situation of aerobic exercise alternation activities before the experiment in the group of university teachers. Second, the overall effect of aerobic exercise alternation activity on occupational stress and chronic anxiety after the experiment in college teachers. Third, the effects of aerobic exercise alternation activities on occupational stress and chronic anxiety before and after the experiment in university teachers in terms of gender, length of teaching and professional title.

## **2 Theoretical Background**

### ***2.1 A Review of Teachers' Mental Health***

Mental health is a state of internal and external coordination and adaptation. In a broad sense, mental health is related to the mechanism of self-satisfaction and the function of self-efficiency and stability. In a narrow sense, it refers to the coordination between the process of individual psychological activities and the will and cognitive behavior of the personality. In the past, the judgment of mental health was mainly based on psychiatric diagnosis. And individuals were only divided into normal mental states and abnormal mental states when distinguishing whether there was a mental disorder. Subsequently, considering that each individual has his own inherent characteristics and lifestyle, it is difficult to concretize the evaluation criteria of mental health. However, from the perspective of prevention, most researchers agree on the ability to pay attention to mental health, and the scope is not limited to psychology, but also applied to many fields such as pedagogy, sociology, psychiatry and so on. From the perspective of pedagogy, Lee [11] took children as objects and believed that mental health was related to mother's parenting efficacy, family happiness, and interpersonal relationships. The higher children's

mental health is, the higher their adaptability to the environment. Garmezy [12] studied from the perspective of sociology and believes that individuals will produce sensitive psychological factors when facing physical or psychological risk factors and adapt to the environment by virtue of experience and potential. WHO [13] the traditional concept of psychiatry believes that mental health is not only spiritual, but also has a definition of highly stable state in physical and social environment. Mancini [14] believed that the significance of mental health from the perspective of psychology is the increase of self-esteem, self-realization, positive interpersonal relationships, well-being and improvement of quality of life.

Wentzel [15] from the perspective of teachers, teachers' teaching technology, knowledge and healthy psychology have a high influence on teaching objects. The reason is that in the process of students' character development and socialization, teachers' role models, especially teachers' psychological characteristics, are the factors that directly affect students. At the same time, Stewart et al. [16] considered students' mental health in class is also related to teachers' mental health level. Whisler [17] considered if teachers are under enormous pressure and mental burden and cannot perform their teaching functions in a healthy way, they will not be able to meet the emotional needs of students. It can be said Roeser et al. [18] considered that teachers are the source of safety and resilience in students' life. The quality of teacher-student relationship will also affect students' social development and reduce students' anxiety tendency. Therefore, teachers' mental health can predict the possible impact on students. The research on teachers' mental health mainly focuses on the stress-related fields of teachers. Among them, Kim et al. [19] conducted a mental health survey on 439 primary and secondary school teachers. Most of them said that in terms of personal characteristics, teachers' mental health problems showed a younger trend, and stress was the main factor. There were adaptability problems in class management, interpersonal relations, schoolwork tasks and physical and mental symptoms. Farber's [20] study mentioned that due to social expectations, educational reforms, school environment, interpersonal relationships and other factors, school organization cannot be closely related to teachers' health. However, it can be proved that teachers' depression will reduce the quality of teaching, lead to the frequent occurrence of sick leave and the probability of breaking away from teaching responsibilities. According to the research of Lynn et al. [21], most of the reasons why teachers fall into mental health problems include conflicts with students, colleagues and managers, social changes and pressures, and social expectations. If appropriate measures are not taken for teachers, teachers will fall into a state of mental sub-health. Shao [22] conducted a survey on the mental health status of teachers in Guangdong Province, China. Among them, teachers with sub-health status accounted for 69.18% and those with disease status accounted for 20.42%.

It can be seen that in fact, Glasser [23] considered most teachers may suffer from the negative impact of external factors in terms of mental health, resulting in varying degrees of imbalance, which is related to their own control ability, that is, individuals cannot ignore the impact of the environment and cannot control themselves essentially, and individuals will be in a depressed state of mental health and well-being for a long time. Therefore, the specific division factors of teachers' mental health in this study are the occupational stress and chronic anxiety factors of teachers in their jobs.

## ***2.2 Teachers' Occupational Stress and Chronic Anxiety***

In physics, pressure refers to the bending force on an object, and then the attribute of pressure is gradually introduced into other disciplines. In physiology, pressure refers to the physiological or psychological coping state of an individual when the external stimulus exceeds a certain limit value in the body, such as shortness of breath and high blood pressure. Sociological Interpretation of stress is that people's negative problems in real life, such as learning problems or interpersonal problems. Often keeping under pressure will have a great threat to people's psychology and physiology. Psychology interprets stress as the non-specific response of various factors in the internal and external environment to

individuals [24]. Therefore, the definition of stress mostly revolves around stimulus experience and interaction.

Occupational stress belongs to the category of stress under the working background. Caplan et al. [25] believed that work stress refers to the characteristics that the work environment poses a threat to individuals, mainly manifested in the inability to meet needs and insufficient resources. That is to say, Moracco et al. [26] considered individuals are affected by stressors for a long time in the working environment, resulting in a series of positive or negative physiological and psychological states, thus affecting the performance of the organization. It can be seen that teachers' occupational stress is also the negative emotional experience teachers experience in the teaching environment, such as nervousness, anger, loss, etc. Kyriacou et al. [27] put forward the concept of perception of teachers' occupational stress, that is, teachers usually perceive whether various pressures are working and make judgments about the threat, but the factors affecting teachers' perception often include teachers' personality, beliefs, attitudes and values. Brenner et al. [28] put forward a new view on it. He believes that the pressure of schools and society on teachers is a process from stimulus to response, that is, the relationship between school stressors and teachers' stress response. In this interrelationship, teachers' degree of control over work, social support, job satisfaction are formed, and teachers' stress state is usually composed of three conditions. Firstly, the work pressure must be caused by teachers' work. Secondly, the external environment interacts with the internal ability needs. Finally, there is the negative discomfort caused by the difference and imbalance from the normal pace of life. The occupational stress of college teachers in this study refers to the long-term continuous exposure of college teachers to the stressors of interpersonal relationships, self-development, and work load in the work environment, which affects their personal work goals and has a negative impact on the body and mind.

Spielberger [29] considered anxiety refers to the state of tension and fear caused by the threat experienced by individuals who worry about their inability to achieve their goals or the inability to restrain obstacles. From a psychological point of view, anxiety is more inclined to the individual's worry about a sense of expectation for the future, and also has a sense of self-identity crisis. However, anxiety also has a positive dynamic role. The same as stress, anxiety will establish a driving force with the conditioned reflex of human function after being stimulated, and has congenital genetic factors at the same time with stress. With the acquired understanding, individuals will not be passive because of anxiety and pressure and environmental threats, but have selectivity and implement response measures. In the previous theory, anxiety is also divided into trait anxiety and state anxiety. State anxiety refers to the psychological anxiety experience in a specific situation. This anxiety has a sense of phased experience, accompanied by psychological emotions of fear and tension and physiological and nervous system reactions such as nausea and sweating. Trait anxiety refers to the long-term characteristics of personality, often showing long-term and stable anxiety due to individual differences. Under the long-term development of trait anxiety and state anxiety theory, different previous studies have differentiated them, such as situational anxiety, personality anxiety, learning anxiety and so on. Situational anxiety is a temporary sudden anxiety caused by a specific situation. Personality anxiety is that individuals are highly sensitive to anxiety and can easily detect potential environmental crises. However, due to their sensitivity, they also have a higher level of anxiety experience than ordinary people. Learning anxiety refers to a series of anxiety factors perceived by learners in learning events or school environment. These factors include worry about academic performance, uneasy relationship between students or teachers and students, unable to adapt to school life and so on.

Teachers' anxiety is the state experience that teachers feel when they are uncertain about goals and expectations in teaching tasks or in the teaching environment. From the perspective of occupational characteristics, teachers' anxiety will be entangled in cognition and emotion for a long time. Compared with other occupations, teachers' chronic anxiety is higher than that of the general population. Ma et al.

[30] found that 56.12% of college teachers were accompanied by different degrees of anxiety, of which 21.58% were severely anxious. In the long-term experience of chronic anxiety, teachers' working hours, family economic conditions and heavy scientific research tasks have become the main factors, and tend to be young people, which also has a certain relationship with the development of cities. The better the development of cities, the more serious the chronic anxiety of teachers. In terms of alleviating teachers' anxiety, humanized school management system and strengthening the direction of educational reform are needed to provide more supporting conditions for teachers' development. However, it usually takes a long time for the implementation and actual implementation of policies. Teachers' chronic anxiety problem has always been in the active position, and the solution behavior has always been in a passive position. The way to solve behaviors and problems that can effectively shorten the time is also a way that most researchers are constantly looking for. Xiao et al. [31] believed that the main factors affecting the long-term anxiety of teachers are the evaluation of teachers by students or school organizations, work load, and the inability of teachers to plan their own future and career development in the organizational environment. It can be seen from the above research that teachers, Horwitz [32] considered as a specific social group, in addition to the anxiety in the teaching environment, also face the anxiety of other factors such as family and economy, and this type of anxiety also has long-term and stable effects. In addition, we understand that anxiety and stress have a certain common effect. Therefore, when teachers' stress and anxiety about the teaching profession have exceeded the scope of individual tolerance, they will have mental health problems, which gradually evolve into conflicts between themselves and the professional environment. Resulting in manic or depressive performance tendency, and the experience of stress and anxiety does not lie in the order, it may be triggered at the same time, or it may lie in the situation that individuals experience stress first and then anxiety, or anxiety comes first and stress comes later. McGrath [33] considered the pressure and anxiety faced by university teachers will also appear in the situation of limited teaching ability, scientific research pressure or limited self-development, long-term investment in knowledge learning, and unequal economic income and treatment. These are all long-term and cumulative problems. Each teacher has different coping mechanisms for stress and anxiety, but if they have been developing in such situations, teachers may pay more attention to hope, avoidance and emotional resolution. At the same time, teachers will gradually change from active stress or anxiety to passive, which will have a negative impact on the progress of teaching tasks and students' individual development. Therefore, teachers' occupational stress and chronic anxiety have always been the main problem-solving factors in teachers.

### ***2.3 The Relationship between Aerobic Sports and Anxiety and Stress***

Since the 20th century, people have paid more and more attention to physical exercise. In addition to daily life, there also have been many studies on its role in the field of psychology, mostly focusing on the relationship between sports and mental health. In the study of Lobel [34], the subjects were trained in jogging and walking. The results showed that both methods could increase the ability of situational stress response, that is, the mentality of coping with emergencies was improved. Anderson et al. [35] conducted a physical exercise test of 20–60 min each time for the participants, and the results showed that exercise training can increase the individual's ability to improve mood. The research of Ashmore et al. [36] also proved that there is a positive correlation between exercise and decompression and improving self-esteem, and revealed that exercise has the medical function of reducing adrenaline, heart rate and blood pressure. Therefore, long-term exercise can play a stable supporting role with psychological benefits, especially in the treatment of chronic stress and anxiety, a stable sports lifestyle has the function of relieving stress and anxiety.

However, during the maintenance of a single exercise, exercising for too long or maintaining a single form of exercise will not relieve stress and anxiety, but may lead to improvement. Li [37] conducted relevant research on camp sports and leisure sports. The results show that the camp participants are

mainly young people, and most of them are students. However, due to the limited business projects of the camp, the lack of enrichment of the types of leisure sports, and the less training experience and younger age of the camp trainers, it will lack more development possibilities for the camp leisure sports, resulting in the failure of the participants to obtain more experience. Liu [38] observed 210 college students and found that jogging for more than 3 h or maintaining jogging for a month, the effect on emotional relief began to gradually decrease during the last 10 days. Therefore, it can be found that camp type sports intervention on mental health requires personnel guidance and is rare in daily life. Among the common types of sports, moderate and polynomial mixed sports may have a better intervention effect on the individual's internal emotion and stress. Based on this, in the treatment of alternating activities of aerobic exercise in this study, teachers were arranged with three items of jogging, swimming and cycling. The experiment was carried out for three days a week, two hours a day, for a total of one month.

### 3 Research Methods

#### 3.1 Participants

The participants of this study are shown in Table 1. Teachers from three universities in Yunnan Province are selected to carry out alternate activities of aerobic exercise, Questionnaires are distributed and collected by relevant personnel. The number of participants before the experiment is 354. Finally, a total of 214 valid samples can be analyzed, including 110 female teachers, 104 male teachers, 108 teachers with teaching experience of 1–5 years, 64 teachers with 6–10 years, 42 teachers with more than 10 years, 126 teaching assistants and lecturers, and 88 associate professors and professors.

**Table 1:** Participants

	Category	Number of people
Gender	Male	104
	Female	110
Length of teaching	1–5	108
	6–10	64
	More than 10 years	42
Professional title	Teaching assistants and lecturers	126
	Associate professor and professor	88
Total		214

#### 3.2 Research Tools

The occupational stress and chronic anxiety scale for teachers in this study is shown in Table 2. The occupational stress scale is based on the research of Parker et al. [39]. The dimension consists of 3 sub-factors: 4 questions on interpersonal relationships, 4 questions on spontaneous development, and 4 questions on workload. There are 12 questions in total. The higher the score is, the higher the level of occupational stress is. The overall Cronbach's of occupational stress is 0.783, the interpersonal relationship is 0.754, the self-development is 0.736, and the workload is 0.813. The chronic anxiety scale is based on the research of Wang [40]. The dimension is composed of two sub-factors, 5 items of environmental anxiety and 5 items of academic burden. There are 10 items in total. The higher the score, the higher the level of chronic anxiety. The higher the score is, the higher the level of chronic anxiety is. The overall Cronbach's of chronic anxiety is 0.751, the environmental anxiety is 0.814, and the academic burden is 0.709. Both scales use the 5-point Likert scale (1 = not at all, 5 = very Yes) to answer the level of their occupational stress and chronic anxiety.

**Table 2:** Occupational stress and chronic anxiety scale

	Variable	Item	Reliability
Occupational stress	Interpersonal relationship	4	0.754
	Self-development	4	0.736
	Workload	4	0.813
	Total		0.783
Chronic anxiety	Environmental anxiety	5	0.814
	Academic burden	5	0.709
	Total		0.751

### 3.3 Research Procedures

First of all, this study uses SPSS 25.0 software to test the data results, and uses Cronbach's alpha to verify the reliability of the questionnaire and record the scores before the experiment. Secondly, the aerobic exercise alternate activity experiment is carried out for a period of 1 month, 2 h a day, 3 days a week. The outline of the experiment is shown in Table 3. Before the start of each exercise, there is a 10-min warm-up training and sports safety knowledge training to prevent the participants from injury or dangerous accidents. The evaluation is performed again after the aerobic exercise alternation activity, and the differences before and after the experiment are compared.

**Table 3:** Outline of alternate activities for aerobic exercise

Schedule	Activity items	Time/minute	Content
Odd week: Monday, Wednesday, Friday.	Jogging	10	Warm up and safety training
		30	Group jogging
Dual weeks: Tuesday, Thursday, Saturday	Swimming	10	Warm up training
		30	Group swimming
	Cycling	10	Safety training
		30	Individual bicycle

### 3.4 Research Results

#### 3.4.1 Changes of Occupational Stress and Chronic Anxiety before and after the Experiment on the Overall Level

The results of the overall impact analysis of aerobic exercise alternation activities are shown in Table 4. Before the experiment, interpersonal relationships ( $M = 3.54$ ), self-development ( $M = 3.58$ ), workload ( $M = 3.67$ ), and environmental anxiety ( $M = 3.71$ ), academic burden ( $M = 3.73$ ), It can be seen that the workload factor of college teachers in occupational stress and the academic burden factor of chronic anxiety are the highest level of all factors, followed by self-development, interpersonal relationship in occupational stress factor and environmental anxiety factor in chronic anxiety. After the experiment, interpersonal relationship ( $M = 3.21$ ), self-development ( $M = 3.13$ ), workload ( $M = 3.23$ ), environmental anxiety ( $M = 3.18$ ) and academic burden ( $M = 3.27$ ). Although the highest factor level of occupational stress and chronic anxiety after the experiment is still workload and academic burden, it can be seen from the change and significance of the mean score that the interpersonal relationship ( $t = 3.241$ ), self-development



( $t = 3.315$ ), work load ( $t = 2.124$ ), environmental anxiety ( $t = 2.261$ ) and academic burden ( $t = 3.443$ ) before and after the aerobic exercise alternating activity experiment are statistically significant ( $P < 0.05$ ).

**Table 4:** Overall differences before and after the experiment

Variable		Before experiment (M + SD)	After experiment M + SD	t	P
Occupational stress	Interpersonal relationship	3.54 ± 0.41	3.21 ± 0.53	3.241	0.039
	Self-development	3.58 ± 0.54	3.13 ± 0.61	3.315	0.021
	Workload	3.67 ± 0.32	3.25 ± 0.59	2.124	0.025
Chronic anxiety	Environmental anxiety	3.71 ± 0.43	3.18 ± 0.63	2.261	0.002
	Academic burden	3.73 ± 1.06	3.27 ± 0.41	3.443	0.036

#### 3.4.2 Changes of Occupational Stress and Chronic Anxiety before and after the Experiment on the Gender Level

The analysis before and after the experiment on the gender level is shown in Table 5. Before the experiment, male interpersonal relationships ( $M = 3.49$ ), self-development ( $M = 3.45$ ), workload ( $M = 3.59$ ), environmental anxiety ( $M = 3.55$ ), academic burden ( $M = 3.66$ ), the work load and academic burden factors of male university teachers are the highest scores of all factors, followed by environmental anxiety, interpersonal relationship and self-development. After the experiment of alternating activities of aerobic exercise, interpersonal relationship ( $M = 3.06$ ), self-development ( $M = 3.03$ ), workload ( $M = 3.11$ ), environmental anxiety ( $M = 3.07$ ), academic burden ( $M = 3.15$ ) decrease significantly. Therefore, the effects of alternate activities of aerobic exercise on male's interpersonal relationship ( $t = 3.241$ ), self-development ( $t = 3.315$ ), workload ( $t = 2.124$ ), environmental anxiety ( $t = 2.261$ ) and academic burden ( $t = 3.443$ ) are statistically significant ( $P < 0.05$ ).

**Table 5:** Gender differences before and after the experiment

Gender	Variable	Before experiment (M + SD)	After experiment M + SD	t	P	
Male	Occupational stress	Interpersonal relationship	3.49 ± 0.43	3.06 ± 0.49	3.353	0.039
		Self-development	3.45 ± 0.41	3.03 ± 0.61	3.312	0.041
		Workload	3.59 ± 0.36	3.11 ± 0.90	2.114	0.015
	Chronic anxiety	Environmental anxiety	3.55 ± 0.30	3.07 ± 0.35	2.267	0.030
		Academic burden	3.66 ± 0.23	3.15 ± 0.75	3.531	0.036
Female	Occupational stress	Interpersonal relationship	3.45 ± 0.46	3.16 ± 0.73	3.350	0.043
		Self-development	3.39 ± 0.33	3.12 ± 0.51	2.276	0.008
		Workload	3.51 ± 0.48	3.06 ± 0.56	3.112	0.025
	Chronic anxiety	Environmental anxiety	3.49 ± 0.41	3.13 ± 0.81	3.266	0.020
		Academic burden	3.57 ± 0.83	3.03 ± 0.24	3.475	0.005

Before the experiment, female interpersonal relationship ( $M = 3.45$ ), self-development ( $M = 3.39$ ), workload ( $M = 3.51$ ), environmental anxiety ( $M = 3.49$ ) and academic burden ( $M = 3.57$ ). The highest score factors of female university teachers and male university teachers are the same, which are also workload and academic burden. Female's interpersonal relationship ( $M = 3.16$ ), self-development ( $M = 3.12$ ), workload ( $M = 3.06$ ), environmental anxiety ( $M = 3.13$ ), academic burden ( $M = 3.03$ ) after the aerobic exercise alternating activity experiment decrease significantly. The T value shows that interpersonal relationships ( $t = 3.241$ ), self-development ( $t = 3.315$ ), workload ( $t = 2.124$ ), environmental anxiety ( $t = 2.261$ ), and academic burden ( $t = 3.443$ ) are all statistically significant ( $P < 0.05$ ). Therefore, alternate activities of aerobic exercise also have a significant impact on females. Before the experiment, both male university teachers and female university teachers are at the middle-to-upper average level of occupational stress and chronic anxiety, and the occupational stress and chronic anxiety of male university teachers are higher than those of female university teachers. After the experiment, male and female teachers remain at the medium level.

### 3.4.3 Changes of Occupational Stress and Chronic Anxiety at the Level of Length of Teaching before and after the Experiment

As for the analysis before and after the experiment at the level of length of teaching, as shown in [Table 6](#), the interpersonal relationship ( $M = 3.57$ ), self-development ( $M = 3.49$ ), workload ( $M = 3.62$ ), environmental anxiety ( $M = 3.51$ ) and academic burden ( $M = 3.64$ ) of university teachers with teaching experience of 1–5 years before the experiment, after the aerobic exercise alternating activity experiment, interpersonal relationship ( $M = 3.10$ ), self-development ( $M = 3.07$ ), workload ( $M = 3.15$ ), environmental anxiety ( $M = 3.01$ ) and academic burden ( $M = 3.13$ ) decrease significantly. Therefore, the effects of alternate activities of aerobic exercise on interpersonal relationship ( $t = 2.442$ ), self-development ( $t = 3.511$ ), workload ( $t = 2.421$ ), environmental anxiety ( $t = 3.279$ ) and academic burden ( $t = 3.436$ ) of college teachers with teaching years of 1–5 years are statistically significant ( $P < 0.05$ ).

**Table 6:** Differences in length of teaching before and after the experiment

Length of teaching	Variable	Before experiment (M + SD)	After experiment M + SD	t	P	
1–5	Occupational stress	Interpersonal relationship	3.57 ± 0.57	3.10 ± 0.47	2.442	0.030
		Self-development	3.49 ± 0.30	3.07 ± 0.60	3.511	0.023
	Chronic anxiety	Workload	3.62 ± 0.56	3.15 ± 0.51	2.421	0.055
		Environmental anxiety	3.51 ± 0.68	3.01 ± 0.33	3.279	0.011
		Academic burden	3.64 ± 0.40	3.13 ± 0.62	3.436	0.007
6–10	Occupational stress	Interpersonal relationship	3.50 ± 0.69	3.13 ± 0.67	3.230	0.044
		Self-development	3.47 ± 0.56	3.05 ± 0.71	3.226	0.036
	Chronic anxiety	Workload	3.57 ± 0.23	3.19 ± 0.22	2.541	0.021
		Environmental anxiety	3.48 ± 0.12	3.08 ± 0.54	2.826	0.033
		Academic burden	3.60 ± 0.85	3.16 ± 0.86	3.525	0.031

(Continued)

**Table 6 (continued)**

Length of teaching	Variable	Before experiment (M + SD)	After experiment M + SD	t	P	
<10	Occupational stress	Interpersonal relationship	3.43 ± 0.59	3.05 ± 0.63	3.610	0.021
		Self-development	3.36 ± 0.31	3.03 ± 0.65	2.375	0.004
	Workload	3.53 ± 0.90	3.10 ± 0.97	2.442	0.039	
	Chronic anxiety	Environmental anxiety	3.44 ± 0.92	3.14 ± 0.44	2.298	0.006
		Academic burden	3.55 ± 1.51	3.19 ± 0.65	3.114	0.041

6–10 years of teaching experience, interpersonal relationship (M = 3.50), self-development (M = 3.47), workload (M = 3.57), environmental anxiety (M = 3.48), academic burden (M = 3.60) before the experiment. After the experiment of alternating activities of aerobic exercise, interpersonal relationship (M = 3.13), self-development (M = 3.05), workload (M = 3.19), environmental anxiety (M = 3.08) and academic burden (M = 3.16) decrease significantly. There are statistical significance in interpersonal relationship (t = 3.230), self-development (t = 3.226), work load (t = 2.541), environmental anxiety (t = 2.826), and academic burden (t = 3.525) ( $P < 0.05$ ).

Before the experiment, teachers with more than 10 years of teaching experience have interpersonal relationship (M = 3.43), self-development (M = 3.36), workload (M = 3.53), environmental anxiety (M = 3.44) and academic burden (M = 3.55). After the experiment of alternating activities of aerobic exercise, interpersonal relationship (M = 3.05), self-development (M = 3.03), workload (M = 3.10), environmental anxiety (M = 3.14) and academic burden (M = 3.19) decrease significantly. There are also statistical significance in interpersonal relationships (t = 3.610), self-development (t = 2.375), workload (t = 2.442), environmental anxiety (t = 2.298), and academic burden (t = 3.114) ( $P < 0.05$ ).

Therefore, the alternate activities of aerobic exercise also have a significant impact on the length of teaching. Before the experiment, college teachers with teaching experience of 1–5 years are at the highest level in terms of occupational stress and chronic anxiety, followed by teachers with teaching experience of 6–10 years, and finally teachers with teaching experience of more than 10 years. It is worth mentioning that no matter which teaching period in the three teaching experience ranges, the workload and academic burden are always at the highest level compared with other factors, However, after the aerobic exercise alternate activity experiment, it has a positive effect on occupational stress and chronic anxiety at all levels of length of teaching.

#### 3.4.4 Changes in Occupational Stress and Chronic Anxiety at the Professional Title Level before and after the Experiment

The analysis before and after the experiment at the professional title level is shown in Table 7. Before the experiment, the university teachers with the title of teaching assistant and lecturer have the interpersonal relationship (M = 3.61), self-development (M = 3.64), workload (M = 3.73), environment Anxiety (M = 3.56), academic burden (M = 3.75). After the experiment, interpersonal relationship (M = 3.07), self-development (M = 3.13), workload (M = 3.16), environmental anxiety (M = 3.11) and academic burden (M = 3.09) decrease significantly. It can be seen that the effects on interpersonal relationships (t = 3.265), self-development (t = 3.526), workload (t = 3.361), environmental anxiety (t = 3.413), and academic burden (t = 3.802) are all statistically significant ( $P < 0.05$ ).

**Table 7:** Differences in professional titles before and after the experiment

Title	Variable	Before experiment (M + SD)	After the experiment (M + SD)	t	P	
Teaching Assistants and Lecturers	Occupational stress	Interpersonal relationship	3.61 ± 0.45	3.07 ± 0.75	3.265	0.007
		Self- development	3.64 ± 0.56	3.13 ± 0.54	3.526	0.016
		Workload	3.73 ± 0.67	3.16 ± 0.82	3.361	0.008
	Chronic anxiety	Environmental anxiety	3.56 ± 0.37	3.11 ± 0.33	3.413	0.006
		Academic burden	3.75 ± 0.79	3.09 ± 0.81	3.802	0.023
Associate Professor and Professor	Occupational stress	Interpersonal relationship	3.44 ± 0.49	3.12 ± 0.61	3.612	0.013
		Self- development	3.38 ± 0.47	3.05 ± 0.30	3.155	0.017
		Workload	3.46 ± 0.51	3.10 ± 0.44	2.192	0.031
	Chronic anxiety	Environmental anxiety	3.40 ± 0.46	2.98 ± 0.52	2.603	0.028
		Academic burden	3.47 ± 0.81	3.07 ± 0.29	3.782	0.003

Before the experiment, associate professors and professors' interpersonal relationship ( $M = 3.44$ ), self-development ( $M = 3.38$ ), workload ( $M = 3.46$ ), environmental anxiety ( $M = 3.40$ ), academic burden ( $M = 3.47$ ). After the experiment, interpersonal relationships ( $M = 3.12$ ), self-development ( $M = 3.05$ ), workload ( $M = 3.10$ ), environmental anxiety ( $M = 2.98$ ), and academic burden ( $M = 3.07$ ) all decrease significantly. T value shows that interpersonal relationship ( $t = 3.612$ ), self-development ( $t = 3.155$ ), workload ( $t = 2.192$ ), environmental anxiety ( $t = 2.603$ ) and academic burden ( $t = 3.782$ ) are statistically significant ( $P < 0.05$ ). Therefore, alternate activities of aerobic exercise also have a significant impact on teachers with various titles. Before the experiment, the professional stress and chronic anxiety of teachers with teaching assistant and lecturer titles are higher than those of associate professors and professors, and the workload and academic burden of university teachers with teaching assistant and lecturer titles are the highest among all factors. After the experiment, the teachers with all professional titles decrease significantly.

#### 4 Conclusion

In this study, teachers from three universities in Yunnan Province, China conducted aerobic exercise alternate activity experiments, and a total of 214 people were statistically processed. Verifying research question 1, that is, the comprehensive situation of aerobic exercise alternating activities in the university teacher group before the experiment: The results show that before the experiment, the overall situation of the occupational stress and chronic anxiety of college teachers is at a relatively high level. Arranging the sub-dimensions in order of severity, they are academic burden, work load, environmental anxiety, self-development, interpersonal relationship, academic burden is the sub-dimension of chronic anxiety, and workload is the sub-dimension of occupational stress. It can be seen that among the college teachers who

generally have high anxiety and stress, the main stress and anxiety are currently distributed in the fields of academic burden and work load.

Verifying the research question 2, that is, the overall effect of aerobic exercise alternating activities on occupational stress and chronic anxiety after the experiment in college teachers. From the results after the experiment, we conclude that the occupational stress and chronic anxiety before and after the experiment have a significant positive mitigation effect. In the results after the experiment, the occupational stress and chronic anxiety of university teachers have been reduced to a medium level. At this time, the sub-dimensions are ranked from high to low as academic burden, work load, interpersonal relationship, environmental anxiety, and self-development. Therefore, the effects of alternating aerobic exercise activities on college teachers' occupational stress and chronic anxiety are both effective and average.

Verifying research question 3: the effects of occupational stress and chronic anxiety before and after the experiment on gender, length of teaching and professional title in the group of university teachers. First of all, in terms of gender, both male and female have significant relieving effects after the experiment. Especially before the experiment, the data shows that the occupational stress and chronic anxiety of male and female teachers are at a medium-to-high level, and the sub-factors such as academic burden, environmental anxiety, workload, interpersonal relationship, and self-development are higher in male teachers than in female teachers. After the experiment, the occupational stress and chronic anxiety of male and female teachers decrease to a medium level, and do not reflect the skewness trend that male are higher than female or female are higher than male in all factors. Secondly, in the analysis at the level of length of teaching, it can be seen that the occupational stress and chronic anxiety of each length of teaching group before the experiment are also at the upper-middle level, but they will decrease with the increase of length of teaching. Among them, teachers with 1–5 years of teaching experience have the highest levels of occupational stress and chronic anxiety, followed by teachers with 6–10 years of teaching experience, and finally teachers with more than 10 years of teaching experience. After the experiment, the situation becomes somewhat optimistic. The occupational stress and chronic anxiety of teachers in the three length of teaching groups are alleviated to a moderate level, and breaks the phenomenon that the less teaching experience is, the greater stress and anxiety is. According to this result, it can also be seen that the alternating activity of aerobic exercise has a significant alleviating effect on college teachers, and has more impact on the occupational stress and chronic anxiety of teachers with less teaching experience. Finally, at the level of professional titles, the occupational stress and chronic anxiety of university teachers with teaching assistant and lecturer titles, associate professors and professors before the experiment are also at a medium-high level, The occupational stress and chronic anxiety of university teachers with teaching assistant and lecturer titles are higher than those with associate professor and professor titles, and the effect after the experiment is also significant, and both are reduced to a moderate level.

According to the above analysis results, alternate activities of aerobic exercise have a significant effect on college teachers, which can effectively promote the mental health of college teachers and relieve negative energy at work. It is worth mentioning that, regardless of gender, length of teaching or professional title, although the effect of aerobic alternating activity experiment has a good performance, the highest before the experiment is still the workload and academic burden. Therefore, it can be inferred that the negative situation of pressure and anxiety of university teachers in scientific research and work needs to be taken seriously. If relevant units or institutions arrange such sports activities, it can effectively improve the mental health of current university teachers and achieve a good self-inner cycle. In the future research, we can consider more sports activities for college teachers to reduce stress and alleviate anxiety, or observe other factors that induce college teachers' stress and anxiety, so as to bring more reference materials.

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