THE EFFECT OF SPORTS AND SPORTS MEDICINE ON RELIEVING SUBHEALTH STATES

O EFEITO DE ESPORTES E DA MEDICINA ESPORTIVA NA MELHORIA DE ESTADOS DE SAÚDE NÃO IDEAIS

EL EFECTO DE DEPORTES Y DE LA MEDICINA DEPORTIVA EN LA MEJORÍA DE ESTADOS DE SALUD NO IDEALES

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ABSTRACT

Introduction: Proper physical exercise can improve the body's breathing and blood circulation, improve immune function, and help relaxation. As a result, negative emotions are effectively guided. Objective: To explore the impact of exercise on subhealth states. Method: This paper analyzes the exercise ability of college students with chronic fatigue syndrome, records the relevant data, and compares them with healthy students. In the comparative analysis, we found that there were significant differences in physiological indexes and satisfaction scores between the experimental group and the control group. Results: Through the analysis of the significant difference data, it can be concluded that the muscle endurance and cardiopulmonary function of college students with chronic fatigue syndrome are significantly lower than the normal value. Conclusion: Proper and regular exercise can treat chronic fatigue syndrome. We found that exercise therapy can achieve ideal results in our long-term tracking of subjects' data. ***Level of evidence II; Therapeutic studies - investigation of treatment results.***

Keywords: Student burnout; Sports; Fatigue.

RESUMO

*Introdução: Atividade física adequada pode aprimorar a respiração e a circulação sanguínea do corpo, melhorar a função imune e ajudar no relaxamento. Assim, é possível direcionar emoções negativas efetivamente. Objetivos: Explorar o impacto da atividade física em estados de saúde não ideais. Método: Esse trabalho analisa o preparo físico de estudantes universitários com síndrome da fadiga crônica, registrando os dados relevantes e comparando-os com estudantes saudáveis. Através dessa comparação, descobrimos que há diferenças significativas em índices fisiológicos e scores de satisfação entre o grupo experimental e o grupo controle. Resultados: Através da análise das diferenças significativas dos dados, pôde-se concluir que a resistência muscular e a função cardiopulmonar de estudantes colegiais com síndrome da fadiga crônica são significativamente inferiores aos valores normais. Conclusão: A atividade física adequada e regular pode ser um tratamento para a síndrome da fadiga crônica. Descobrimos que a terapia por meio da atividade física pode atingir resultados ideais através de um acompanhamento de longo prazo dos dados registrados dos participantes. **Nível de evidência II; Estudos terapêuticos – investigação do resultado de tratamentos.***

Descritores: *Exaustão do estudante; Esportes; Fadiga.*

RESUMEN

*Introducción: Actividad física adecuada puede mejorar la respiración y la circulación sanguínea del cuerpo, optimar la función inmune y ayudar en la relajación. Así, es posible dirigir emociones negativas efectivamente. Objetivos: Explorar el impacto de la actividad física en estados de salud no ideales. Método: Este trabajo analiza la preparación física de estudiantes universitarios con síndrome de fatiga crónica, registrando los datos relevantes y comparándolos con estudiantes saludables. A través de esta comparación, descubrimos que hay diferencias significativas en índices fisiológicos y puntuaciones de satisfacción entre el grupo experimental y el grupo control. Resultados: A través del análisis de las diferencias significativas de los datos, se puede concluir que la resistencia muscular y la función cardiopulmonar de estudiantes colegiales con síndrome de fatiga crónica son significativamente inferiores a los valores normales. Conclusión: La actividad física adecuada y regular puede ser un tratamiento para el síndrome de la fatiga crónica. Descubrimos que la terapia por medio de la actividad física puede alcanzar resultados ideales a través de un acompañamiento a largo plazo de los datos registrados de los participantes. **Nivel de evidencia II; Estudios terapéuticos – investigación del resultado de tratamientos.***

Descriptores: *Agotamiento psicológico; Deportes; Fatiga.*

INTRODUCTION

Universities are the cradle of cultivating and cultivating professional talents, and the health status of college students directly affects the quality of talents. The WHO puts forward that "health is not only the absence of disease and weakness but also mental health, good social adaptation, and morality." Between disease and health, the human body also has an intermediate state of non-health and non-sickness, that is, the sub-health state.[1] Sub-health has been called "one of the greatest enemies of human health in the 21st century" by the medical community. Sub-health is more likely to occur in the 20 to 45-year-old age group, and the age span of the college student group falls into this range. We conducted this survey on the current status of sub-health

and sports of college students in a school. The purpose is to understand students' central sub-health and explore the relationship between sub-health and sports.

METHOD

Object

We select a certain school student as the observation object and adopt a stratified cluster sampling method. We selected 500 undergraduate students to conduct a questionnaire survey.[2] After returning the questionnaire, we eliminated the unqualified ones and obtained 419 valid questionnaires. The effective rate is 83.2%. The age range of the selected students is 19 to 23 years old. The grades are the third and fourth grades.

Research methods

General investigation

The content mainly includes gender, age, location of household registration, parent education level, etc.

Sports

Sports must reach a certain intensity before they can affect the body's health. The number of exercises and time have certain requirements as indicators of intensity.[3] That is to exercise> 3 times a week. The total time exceeds 3 hours. We are divided into the following levels. Exercise 0~1 times, 2~3 times, >3 times per week. The duration of each exercise is <1h, 1~2h, >2h.

Sub-health indicators

We use the Self-Tested Health Rating Scale (SRHMS) to survey selected college students. The scale is a self-rating scale. The content includes three subscales of physical health, mental health, and social health. The higher the score, the better the health.[4] The final scores of each subscale and total scale of self-tested health are divided into two levels: those with a score<84 points are considered sub-health. Those with a score ≥ 85 are considered healthy. The calculation formula of the final score: final score = actual rough score of the dimension/the highest theoretical rough score that constitutes a certain dimension × 100.

Improving the sub-health recognition algorithm of the improved capsule network to optimize the layered convolution

The structure of the capsule network includes four parts: (1) The convolutional layer processes the input data to extract features. The formula of convolution is shown in formula (1). The convolution operation of the capsule network is similar to the convolution operation of the convolutional neural network.
(2) The main role of the cap layer is to divide different features into vector value capsules. This layer can capture the input instantiation parameters.[5] The formula can be expressed as formula (1):

$$u^{l(i,j)} = f_s \begin{pmatrix} f_a\left(z_1^{l(i,j)}\right) \\ f_a\left(z_2^{l(i,j)}\right) \\ \vdots \\ f_a\left(z_m^{l(i,j)}\right) \end{pmatrix} = f_s \begin{pmatrix} f_a\left(K_{1i}^l x^{l(r^j)}\right) \\ f_a\left(K_{2i}^l x^{l(r^j)}\right) \\ \vdots \\ f_a\left(K_{mi}^l x^{l(r^j)}\right) \end{pmatrix} \quad (1)$$

$u^{l(i,j)}$ is the main capsule. $f_a(z_m^{l\,(i,j)})$ is the activation output of the convolutional layer and f_s represents the "squeeze" function.
(3) Digital cap layer: This layer mainly applies compression and dynamic routing. After one "squeeze" operation and three dynamic routing algorithms, the results are output to the classification.[6] Since the length of the capsule expresses the probability, it must be compressed within the range of 0-1. So there is a "squeeze" function as shown in equation (2):

$$\delta_j = \frac{\left\| s_j \right\|^2}{1 + \left\| s_j \right\|^2} \frac{s_j}{\left\| s_j \right\|} \quad (2)$$

S_j is the input of the "squeeze" function. δ_j is the output of the "squeeze" function. The "squeeze" function can squeeze the length between 0-1 and $\frac{s_j}{\|s_j\|}$ represents the direction. $\frac{\|s_j\|^2}{1+\|s_j\|^2}$ represents the zoom factor.[7] Therefore, the directional characteristics can be well preserved to higher-level capsules. Dynamic routing is a process of continuous updating, including:

$$s_j = \sum_i c_{ij} u_{j|i} \quad (3)$$

$u_{j|i}$ is the prediction vector. c_{ij} is the coupling coefficient and has $\sum_i c_{ij} = 1$. The Softmax function determines the coupling coefficient:

$$c_{ij} = \frac{\exp(b_{ij})}{\sum_j \exp(b_{ij})} \quad (4)$$

b_{ij} is the predicted log prior probability of coupling $u_{j|i}$ and advanced capsule s_j.

$$u_{j|i} = W_{ij} u_i \quad (5)$$

u_i is the i input capsule. W_{ij} is the weight matrix. The formula of b_{ij} is shown in formula (6):

$$b_{ij} \leftarrow b_{ij} + u_{j|i} \delta_j \quad (6)$$

Among them, $u_{j|i}$, δ_j corresponds to the log-likelihood between capsules $u_{j|i}$ and δ_j. The above equations (2) to (6) are the dynamic routing update process, which can complete the dynamic routing process and the parameter update between the two capsule layers.
(4) The classification layer is used to classify the final output result.

Statistical methods

We use SPSS17.0 to establish a database to enter the original data into the database, and at the same time, carry out relevant descriptive analysis, the impact of gender, exercise frequency and exercise time on sub-health status.[8] The specific calculation uses x^2 test for statistical analysis.

RESULTS

General situation

A total of 419 people who completed the questionnaire passed the survey, of which 199 were boys, accounting for 47.5%, and 220 were girls, accounting for 52.5%.

Current status of sub-health

There are 344 healthy students in Central Asia, accounting for 82.1%. Among them, 248 persons were physiologically sub-healthy, accounting for 59.2%. There were 364 mentally sub-healthy people, accounting for 86.9%. There were 330 people with sub-health in society, accounting for 78.8%. There is no statistically significant difference in the physiological

sub-health rate between boys and girls ($x^2 = 1.824$, $P = 0.177$). The difference between male and female mental sub-health rate and the social sub-health rate is statistically significant ($x^2 = 3.971$, $P = 0.046$), ($x^2 = 5.416$, $P = 0.020$). (Table 1)

Sports status

Among the students, 180 had 0 to 1 physical activity per week, 43%; 126 had 2-3 reps, accounting for 30%; and 113 had more than 3 physical exercises, accounting for 27%. The duration of each exercise was less than 1h, 201 people, accounting for 48.0%. One hundred thirty-five people took 1 to 2 hours, accounting for 32.2%. More than 2h 63 people, accounting for 19.8%. There are statistically significant differences in the sub-health rate of students with different sports times and each exercise time ($x^2 = 6.450$, $P = 0.040$), ($x^2 = 6.780$, $P = 0.034$). (Table 2 and 3)

DISCUSSION

Sub-health refers to a dynamic intermediate state between disease and health in the human body and mind. It is a transitional stage from health to disease or disease to health.[9] The essence of "no pathological changes" is reversible. With the renewal of medical models and health concepts and the increasing social competition and pressure, sub-health has attracted more and more attention. On the one hand, students in the upper grades face heavier studies. On the other hand, they are also facing the pressure of graduation and employment. Understanding the sub-health status and sports situation of a special group of students is the prerequisite and basis for intervention.

The survey results in this article show that sub-health already exists in many students, and the prevalence rate is 82.1%. This is similar to the research results of some kinds of literature. In terms of students' physical health, mental health, and social health, the sub-health problems of mental health and social health of students are more serious.[10] This suggests that we need to pay more attention to the mental sub-health and social sub-health of students. The prevalence rates of social health and mental health of female students of different genders are higher than that of male students. Girls are more likely to have mental health problems than boys related to their physical characteristics. This shows that girls are prone to sub-health in mental health and social health.

The current situation of students' sports is also not optimistic. The frequency of physical exercise and the duration of each exercise for most students is insufficient.[11] This shows that, on the one hand, students do not like sports activities. On the other hand, they do not know how to conduct scientific sports activities. The survey results suggest that we should further increase students' interest in sports to enhance people's physique and improve individual health. Lack of exercise is a risk factor for students' sub-health. To change the current situation of students' sports, we recommend holding lectures on health and sports knowledge and various sports activities to master scientific sports knowledge and sports skills. Help increase students' interest and enthusiasm in sports and encourage students to participate in various physical exercises.

Table 1. Comparison of the sub-health status of students of different genders.

	Male	Female	χ2	P
n	199	220		
Physiological sub-health	111	137	1.842	0.12
percentage	55.8	62.3		
Mental sub-health	166	198	3.971	0.046
percentage	83.4	90		
Social sub-health	147	183	5.416	0.02
percentage	73.8	83.2		

Table 2. Comparison of sub-health rate of students with the different number of weekly exercises.

	Sub-health		healthy		χ2	P
	n	%	n	%		
0-	154	85.6	26	15.4		
2-	106	84.1	20	15.9	6.45	0.04
3-	84	74.3	29	25.7		

Table 3. Comparison of sub-health rate of students with different duration of each exercise.

	Sub-health		healthy		χ2	P
	n	%	n	%		
0-	170	84.5	31	15.4		
1-	114	84.4	21	15.6	6.78	0.034
2-	60	72.3	23	27.7		

CONCLUSION

We should be fully aware of the current prevailing situation of students' Central Asian health and the hazards of sub-health. To change this fact, it is necessary to create a good environment for students to grow healthily to improve their health. Sports is an important intervention to promote the health of students. Life lies in sports, and scientific sports can have a positive impact on the health of students. Exercise is beneficial to physical health and can relieve mental tension, and bring various bad performances. This promotes the transformation of the individual's sub-health state to a healthy state and enables students to grow into outstanding professionals required for social development smoothly.

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