

SPORTS AND PHYSICAL EXERCISE ON THE TREATMENT OF DIGESTIVE SYSTEM DISEASES



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ESPORTES E ATIVIDADE FÍSICA NO TRATAMENTO DE DOENÇAS DO SISTEMA DIGESTIVO

DEPORTES Y ACTIVIDAD FÍSICA EN EL TRATAMIENTO DE ENFERMEDADES DEL SISTEMA DIGESTIVO

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ABSTRACT

Introduction: Regular and moderate exercise can keep the body in good function and prolong life. The therapeutic effect of exercise on digestive system diseases is also obvious. In particular, it can alleviate the anxiety of patients with functional dyspepsia. **Objective:** To explore how moderate physical exercise can reduce the anxiety caused by functional dyspepsia. The causes of anxiety in patients with this disease are also analyzed. **Methods:** A questionnaire was applied to patients with functional dyspepsia who attend our hospital and develops exercise programs. The regression analysis method was used to analyze the influence of physical exercise on the anxiety caused by functional dyspepsia. **Results:** The anxiety of patients with functional dyspepsia who did not do physical exercise was significantly different from the anxiety after exercise. **Conclusion:** Exercise can reduce the anxiety of patients with functional dyspepsia. **Level of evidence II; Therapeutic studies - investigation of treatment results.**

Keywords: Dyspepsia; Digestive System; Sports; Anxiety disorders.

RESUMO

Introdução: Atividade física moderada e regular pode manter o bom funcionamento do corpo e prolongar a expectativa de vida. O efeito terapêutico da atividade física nas doenças do sistema digestivo também é evidente. Ela pode, em particular, diminuir a ansiedade de pacientes com dispepsia funcional. **Objetivo:** Explorar como atividade física moderada pode diminuir a ansiedade causada por dispepsia funcional. As causas da ansiedade em pacientes com essa doença também foram analisadas. **Métodos:** Aplicou-se um questionário aos pacientes com dispepsia funcional que frequentam nosso hospital e desenvolveu-se um programa de exercícios. O método de análise de regressão foi usado para avaliar a influência da atividade física na ansiedade causada por dispepsia funcional. **Resultados:** A ansiedade de pacientes com dispepsia funcional que não praticavam atividades físicas foi significativamente diferente daquela de pacientes após os exercícios. **Conclusão:** A atividade física pode diminuir a ansiedade de pacientes com dispepsia funcional. **Nível de evidência II; Estudos terapêuticos – investigação de resultados de tratamento.**

Descritores: Dispepsia; Sistema Digestório; Esportes; Transtornos de Ansiedade.

RESUMEN

Introducción: La actividad física moderada y regular puede mantener el buen funcionamiento del cuerpo y prolongar la expectativa de vida. El efecto terapéutico de la actividad física en las enfermedades del sistema digestivo también es evidente. Esta puede, en particular, disminuir la ansiedad de pacientes con dispepsia funcional. **Objetivo:** Explorar cómo la actividad física moderada puede disminuir la ansiedad causada por dispepsia funcional. Las causas de la ansiedad en pacientes con esta enfermedad también fueron analizadas. **Métodos:** Se aplicó un cuestionario a los pacientes con dispepsia funcional que frecuentan nuestro hospital y se desarrolló un programa de ejercicios. El método de análisis de regresión fue usado para evaluar la influencia de la actividad física en la ansiedad causada por dispepsia funcional. **Resultados:** La ansiedad de pacientes con dispepsia funcional que no practicaban actividades físicas fue significativamente diferente de aquella de pacientes después de los ejercicios. **Conclusión:** La actividad física puede disminuir la ansiedad de pacientes con dispepsia funcional. **Nivel de evidencia II; Estudios terapéuticos – investigación de resultados de tratamiento.**

Descriptores: Dispepsia; Sistema Digestivo; Deportes; Transtornos de Ansiedad.



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INTRODUCTION

The clinical symptoms of functional dyspepsia syndrome often recur, which seriously affects patients' quality of life. Clinical studies have shown that the onset of functional dyspepsia is related to many factors such as life and work pressure, eating habits, and the psychological status of patients. The disease is prone to recurring attacks and long-term troubles in the patient's life and work. At the same time increase the patient's

psychological burden. Some scholars have found that about 20% of patients with functional dyspepsia have different anxiety symptoms.¹ More and more studies have found that psychological factors play an important role in the pathogenesis of functional dyspepsia. Exploring the influencing factors of anxiety in patients with functional dyspepsia is of great significance to improving patients' quality of life.² Sports intervention and psychological intervention as two intervention methods have

played an active role in anxiety psychological intervention in western developed countries. It is of great significance to explore the role of exercise intervention in the anxiety of functional dyspepsia. Based on this research background, in the paper from January 2019 to January 2021, we investigated anxiety in patients with functional dyspepsia syndrome and analyzed its related factors. Explore the improvement of patients' anxiety before and after exercise intervention.

METHOD

Clinical data

We selected 280 patients with functional dyspepsia who were treated in the gastroenterology department of our hospital during the same period. Among them, there are 98 males and 182 females. The age ranged from 17 to 82 (48.03±11.06) years, and the disease course was 1 to 20 (8.16±3.72) years. There were 108 cases of postprandial discomfort syndrome, 91 cases of epigastric pain syndrome, and 81 cases of postprandial discomfort syndrome overlapping upper abdominal pain syndrome.³ The diagnosis met the diagnostic and classification criteria of functional dyspepsia Rome III functional dyspepsia syndrome. Exclude the following patients: patients with organic digestive system diseases such as gastric ulcer and gastric cancer. Patients with cognitive dysfunction, hearing impairment, mental illness, consciousness impairment, etc., who cannot communicate normally complete the investigation of this study. Patients who have recently taken anti-anxiety-related drugs. The hospital ethics committee approved this study, and the patients and their families informed consent.

Questionnaire method

Self-made general situation questionnaire to conduct a questionnaire survey on all patients. The contents of the investigation include the patient's gender, age, marital status, education level, health status, whether other chronic diseases accompany them, whether they have a family history, whether they have experienced negative life events recently, the course of functional dyspepsia, whether they participate in sports, etc. The investigation method is that the investigator and the patient face to face to conduct an on-site investigation.⁴ After the questionnaire is completed, the data entry staff will enter and create a data sheet.

Methods of Anxiety Assessment

The Hamilton Anxiety Scale (HAMA) was used to evaluate the anxiety state of all patients. Count the incidence of anxiety in patients.

Three-dimensional reconstruction method of digestive tract trajectory

First, normalize the reference picture. We choose the first image as the reference image. Assume that the original coordinates of body surface markers 1, 2, and 3 are (\bar{x}_1, \bar{z}_1) , (\bar{x}_2, \bar{z}_2) , (\bar{x}_3, \bar{z}_3) respectively.⁵ We move the body surface marker 3 to the origin. The body surface marker point 1 is rotated to the negative direction of the X axis. Construct the translation matrix M_1 and the rotation matrix M_2 . The expressions are as follows:

$$M_1 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -\bar{x}_3 & -\bar{z}_3 & 1 \end{pmatrix} \quad (1)$$

$$M_2 = \begin{pmatrix} \cos \theta_1 & -\sin \theta_1 & 0 \\ \sin \theta_1 & \cos \theta_1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad (2)$$

In

$$\theta_1 = \arctan \left(\frac{\bar{z}_1 - \bar{z}_3}{\bar{x}_1 - \bar{x}_3} \right) \quad (3)$$

The coordinates of the mark point 1, 2, and 3 on the body surface after the mark translation and rotation are (\bar{x}'_1, \bar{z}'_1) , (\bar{x}'_2, \bar{z}'_2) , (\bar{x}'_3, \bar{z}'_3) respectively. Expressed by the homogeneous coordinates of a two-dimensional point:

$$[\bar{x}'_1, \bar{z}'_1, 1] = [\bar{x}_1, \bar{z}_1, 1] * M_1 * M_2 \quad (4)$$

Calculate the inverse process matrix of the above transformation:

$$RM = \begin{pmatrix} \cos \theta_1 & \sin \theta_1 & 0 \\ -\sin \theta_1 & \cos \theta_1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ \bar{x}_3 & \bar{z}_3 & 1 \end{pmatrix} = \begin{pmatrix} \cos \theta_1 & \sin \theta_1 & 0 \\ -\sin \theta_1 & \cos \theta_1 & 0 \\ \bar{x}_3 & \bar{z}_3 & 1 \end{pmatrix} \quad (5)$$

Statistical methods

We use SPSS17.0 statistical software to use the K-means clustering method to score the HAMA scale. The three-category variables were used as the outcome variables to fit an ordered multi-category Logistic regression model to analyze the influencing factors of anxiety in patients with functional dyspepsia syndrome.⁶ Multivariate stepwise logistic regression analysis was performed with statistically significant variables in the univariate analysis to analyze the risk factors that lead to anxiety. $P < 0.05$ indicates that the difference is statistically significant.

RESULTS

The results of the questionnaire survey are shown in Table 1. The incidence of anxiety state was 71 out of 280 patients, and the incidence of anxiety state was 25.36% (71/280). The univariate analysis of anxiety results in patients with functional dyspepsia is as follows: age ≥ 30 years, poor marital status (divorced or widowed), poor health, and other chronic diseases.⁷ Family history, the recent occurrence of negative life events, and the course of disease \geq three years are the influencing factors of anxiety in patients with functional dyspepsia ($P < 0.05$) (Table 2).

The results of multivariate analysis of anxiety in patients with functional dyspepsia syndrome are as follows: age ≥ 30 years old ($\beta = 1.349$, OR = 3.892, 95% CI 1.569-9.542), poor marital status ($\beta = 1.269$, OR = 3.471, 95% CI 1.482-8.617), poor health ($\beta = 1.408$, OR = 4.103, 95% CI 1.827-9.148), accompanied by other chronic diseases ($\beta = 0.947$, OR = 2.601, 95% CI 1.028 to 6.472) and recent negative life events ($\beta = 1.018$, OR = 2.815, 95% CI 1.138-6.792) is a risk factor for anxiety in patients with functional dyspepsia ($P < 0.05$).

DISCUSSION

Functional dyspepsia syndrome is a common functional gastrointestinal disease in gastroenterology. Research in recent years has shown that with the acceleration of people's lives and work, functional dyspepsia syndrome is on the rise. This has a serious impact on the quality of life of patients.⁸ Due to the recurring clinical symptoms of functional dyspepsia syndrome, patients are prone to abnormal mental states such as anxiety and depression. An abnormal mental state can aggravate the patient's dyspeptic symptoms and affect the patient's recovery, thus forming a vicious circle. Studies have found that psychological intervention can help improve patients' clinical symptoms with functional dyspepsia syndrome, which indicates that

Table 1. Questionnaire survey results.

| Project | Number of cases |
|--|-----------------|
| Gender | |
| Male | 98 |
| Female | 182 |
| Age | |
| <30 | 87 |
| 30-55 | 142 |
| ≥55 | 51 |
| Marital status | |
| Unmarried | 43 |
| Married | 188 |
| Divorced or widowed | |
| Have | 49 |
| Without | 231 |
| Health status | |
| Good | 213 |
| Difference | 67 |
| Whether other chronic diseases accompany it | |
| Yes | 96 |
| No | 184 |
| Whether there is a family history | |
| Yes | 87 |
| No | 193 |
| Whether there has been a negative life event recently | |
| Yes | 186 |
| No | 94 |
| The course of disease (years) | |
| ≤3 | 65 |
| >3 | 215 |
| Education level | |
| College or undergraduate | 159 |
| College or bachelor degree and above | 121 |

psychological factors play an important role in the pathogenesis of functional dyspepsia syndrome. The survey results show that 25.36% of patients with functional dyspepsia have varying degrees of anxiety. This suggests that a certain amount of anxiety occurs in patients with functional dyspepsia syndrome.

With the rapid development of the social economy and the accelerating pace of life, more and more people are under tremendous pressure from family, life, and work. This easily leads to a continuous decline in mental state and even the emergence of diseases such as functional dyspepsia syndrome.⁹ Some scholars have investigated and found that the anxiety state of patients with functional gastrointestinal disease is related to the misunderstanding of their health status, the economic burden of long-term treatment of the disease, and their personality characteristics. This study shows that age ≥ 30 years, poor marital status, poor health, other chronic diseases, and recent negative life events are risk factors for functional dyspepsia with anxiety.

Table 2. Results of univariate analysis of anxiety in patients with functional dyspepsia syndrome.

| Influencing factors | β | \bar{D}_x | Wald | P | OR | 95%CI |
|---------------------------------------|--------|-------------|--------|-------|-------|-------------|
| Gender | 0.601 | 0.319 | 3.462 | 0.064 | 1.809 | 0.971-3.397 |
| Age | | | | | | |
| <30 | -0.522 | 0.542 | 0.975 | 0.319 | 0.591 | 0.199-1.678 |
| 30-55 | 0.813 | 0.408 | 3.859 | 0.042 | 2.239 | 0.997-5.026 |
| ≥55 | 0.932 | 0.476 | 3.913 | 0.036 | 2.274 | 1.021-6.031 |
| Poor marital status | 0.902 | 0.269 | 10.607 | 0.001 | 2.451 | 1.432-4.194 |
| Poor health | 1.304 | 0.312 | 17.264 | 0 | 3.682 | 1.986-6.718 |
| Accompanied by other chronic diseases | 1.641 | 0.351 | 22.385 | 0 | 1.642 | 1.139-2.608 |
| Have a family history | 2.275 | 1.097 | 4.226 | 0.041 | 9.652 | 1.107-3.632 |
| A recent negative life event | 1.064 | 0.331 | 10.438 | 0.001 | 2.903 | 1.516-5.519 |
| Course of disease ≥ 3 years | -1.101 | 0.516 | 4.451 | 0.034 | 0.342 | 0.118-0.931 |
| Highly educated | 0.732 | 0.382 | 3.471 | 0.073 | 1.834 | 0.982-3.412 |

People aged ≥ 30 years old include young adults and the elderly. Young adults need to bear huge pressure in life and work. Young people are the main labor force in the family. Repeated abdominal pain and bloating can seriously disturb their life and work, making them more likely to have anxiety.¹⁰ The elderly are prone to psychological problems caused by loneliness and lack of care, leading to functional dyspepsia. This suggests that patients of this age should pay more attention to the changes in their psychological state during the diagnosis and treatment process. Appropriate intervention can reduce the psychological burden of patients. Other chronic diseases accompany marital statuses such as divorce, widowhood, and separation, and patients with poor health conditions have a heavy psychological burden. It is also prone to negative mental states due to family changes, other chronic diseases, and health conditions. The recent negative life events are stressors for patients. The body's stress state can aggravate the clinical symptoms of functional dyspepsia and induce anxiety. Studies have shown that adequate physical exercise can help reduce or even eliminate the impact of negative life events on patients.¹¹ This method improves the patient's compliance and reduces the patient's anxiety state. Therefore, in clinical diagnosis and treatment, communication between doctors and patients should be strengthened to improve patients' understanding of functional dyspepsia, correct their misunderstandings, and reduce their psychological burden. This can help patients establish a good mentality and make them cooperate with clinical diagnosis and treatment.

CONCLUSION

Patients with functional dyspepsia syndrome are prone to anxiety. Age 30 to <55 years, poor marital status, poor health, other chronic diseases, and recent negative life events are all risk factors leading to anxiety in patients. Clinically, targeted exercise intervention measures should be taken to alleviate the patient's anxiety state. This can improve the clinical efficacy of functional dyspepsia syndrome.

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