

# HUMAN BODY'S HEALTH FUNCTION IMPROVEMENT BY VARIOUS WHOLE-BODY SPORTS EXERCISES



ORIGINAL ARTICLE  
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MELHORIA DA FUNÇÃO DE SAÚDE DO CORPO HUMANO POR MEIO DE VÁRIOS EXERCÍCIOS ESPORTIVOS DE CORPO INTEIRO

MEJORA DE LA FUNCIÓN DE SALUD DEL CUERPO HUMANO MEDIANTE VARIOS EJERCICIOS DEPORTIVOS PARA TODO EL CUERPO

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## ABSTRACT

**Introduction:** Studies have shown that physical exercise is beneficial to people's overall physical and mental health, but few research reports on the effects of different physical exercises on people's human health. **Object:** The paper explores the difference in human health function between people who adhere to traditional health sports and those who rarely exercise and provide a scientific basis for applying and promoting traditional health sports in TCM "prevention of disease". **Methods:** The paper surveyed 526 people who regularly participate in physical exercises and rarely exercise. The exercise items are divided into Tai Chi/Tai Chi sword group, Health Qigong Baduanjin group, Health Qigong Wuqinxi group, and Health Qigong Yijin group. Warp group, walking/jogging group. **Results:** There are differences in the mental indicators of the people in different exercise groups. The overall average percentage levels of and NK cells in each exercise group and the tiny exercise group are different, and the difference is statistically significant ( $P < 0.05$ ). **Conclusions:** Persisting in physical exercise is beneficial to the balance of health and function of the population. **Level of evidence II; Therapeutic studies - investigation of treatment results.**

**Keywords:** Exercise; Medicine, Chinese Traditional; Disease Prevention.

## RESUMO

**Introdução:** Estudos têm demonstrado que o exercício físico é benéfico para a saúde física e mental geral das pessoas, mas existem poucos relatos de pesquisas sobre os efeitos dos diferentes exercícios físicos na saúde humana. **Objetivo:** o documento explora a diferença na função da saúde humana entre pessoas que aderem aos esportes tradicionais de saúde e aqueles que raramente se exercitam e fornece uma base científica para a aplicação e promoção dos esportes tradicionais de saúde na "prevenção de doenças" da medicina tradicional chinesa. **Métodos:** O artigo pesquisou 526 pessoas que praticam exercícios físicos regularmente e raramente praticam exercícios. Os itens de exercícios são divididos em grupo de espada Tai Chi/Tai Chi, grupo de saúde Qigong Baduanjin, grupo de saúde Qigong Wuqinxi e grupo de saúde Qigong Yijin, Grupo Wrap e grupo de caminhada/corrida. **Resultados:** Existem diferenças nos indicadores mentais de pessoas em diferentes grupos de exercícios. Os níveis percentuais médios gerais de células NK e em cada grupo de exercícios e no pequeno grupo de exercícios são diferentes, e a diferença é estatisticamente significativa ( $P < 0,05$ ). **Conclusão:** A persistência na prática de exercícios físicos é benéfica para o equilíbrio da saúde e o funcionamento da população. **Nível de evidência II; Estudos terapêuticos: investigação dos resultados do tratamento.**

**Descritores:** Exercício Físico; Medicina Tradicional Chinesa; Prevenção de Doenças.

## RESUMEN

**Introducción:** Los estudios han demostrado que el ejercicio físico es beneficioso para la salud física y mental general de las personas, pero hay pocos informes de investigación sobre los efectos de diferentes ejercicios físicos en la salud humana de las personas. **Objeto:** El documento explora la diferencia en la función de la salud humana entre las personas que se adhieren a los deportes de salud tradicionales y las que rara vez hacen ejercicio y proporciona una base científica para aplicar y promover los deportes de salud tradicionales en la "prevención de enfermedades" de la medicina tradicional china. **Métodos:** El artículo encuestó a 526 personas que participan regularmente en ejercicios físicos y rara vez hacen ejercicio. Los elementos de ejercicio se dividen en grupo de espada de Tai Chi/Tai Chi, grupo de salud Qigong Baduanjin, grupo de salud Qigong Wuqinxi y grupo de salud Qigong Yijin. Grupo Wrap, grupo de caminar/trotar. **Resultados:** Hay diferencias en los indicadores mentales de las personas en diferentes grupos de ejercicio. Los niveles de porcentaje promedio general de células NK y en cada grupo de ejercicio y el pequeño grupo de ejercicio son diferentes, y la diferencia es estadísticamente significativa ( $P < 0.05$ ). **Conclusión:** La persistencia en el ejercicio físico es beneficiosa para el equilibrio de la salud y el funcionamiento de la población. **Nivel de evidencia II; Estudios terapéuticos: investigación de los resultados del tratamiento.**

**Descriptor:** Ejercicio Físico; Medicina China Tradicional; Prevención de Enfermedades.



## INTRODUCTION

Studies have shown that physical exercise is beneficial to the overall physical and mental health of people. However, few research reports on the effects of different physical exercises on people's health.<sup>1</sup> This study observes the differences in attention, intelligence, mood, mental status, physical health and immune function between people who regularly participate in physical exercise and those who rarely participate in physical exercise and provides a basis for scientifically guiding people to perform traditional physical exercise.

## METHOD

### Investigation method

The paper randomly distributed 600 questionnaires to people in a specific area who often participate in outdoor exercise and rarely participated in exercise.<sup>2</sup> Five hundred sixty copies were recovered after the on-site survey, of which 526 valid questionnaires were valid.

We divide each exercise group into Tai Chi/Tai Chi sword group, Health Qigong Ba Duan Jin group, Health Qigong Wu Qin Xi group, Health Qigong Yi Jin Jing group, walking/jogging group, and other exercise groups according to the exercise items. According to this subject's requirements, 52 people from other exercise groups were deleted, and 227 traditional physical exercisers were eventually included in psychology and immunology test subjects, and 135 exercisers were rarely exercised. It was confirmed that 156 subjects voluntarily participated in the health function test, of which 114 participated in the exercise, and 42 were rarely exercised.

## MULTIDIMENSIONAL PSYCHOMETRIC METHODS

### Crossword test

The test provides the testees with a test paper with randomly arranged Arabic numerals (10×10 numbers, 00~99), and the time limit is 2 minutes.<sup>3</sup> The testees are required to look up from 00 in the order, and when they find one, they use a pen to mark out one. The primary trial electronic stopwatch controls the time and counts the numbers drawn by the subjects within 2 minutes. The test mainly measures the attentional quality of the research subjects.

### Raven Test

The test uses graphical reasoning to test the testees' intelligence level, such as analysis and reasoning. Because it is conducted outdoors, the subjects are mostly morning exercisers, and it isn't easy to do the test for a long time.<sup>4</sup> Therefore, the Raven test used in this research has been reduced from the original 72 questions to 12 questions, and the predicted difficulty is 0.5 on average.

### Clinical symptoms

The self-rating scale (SCL-90) can be used as an assessment tool for testing various mental symptoms and evaluating various occupational groups' mental health. It has high reliability and validity.<sup>5</sup>

### Health function testing indicators and methods

Before 9 a.m., we draw 1 mL of the subject's peripheral venous blood and inject it into an EDTA-K2 anticoagulant tube, store it at room temperature, and use it for lymphocyte subset detection within 24 hours; at the same time, we draw 4 mL of venous blood and inject it into the vacuum blood collection tube. Used to detect serum immunoglobulin.

### Detection of lymphocyte subsets

We take 50µL of the above anticoagulant blood and add them to two test tubes. One tube adds 10µL fluorescent antibody  $CD_3^-$  percp/ $CD_4^-$  FITC/ $CD_8^-$  PE, and the other tube adds 10µL fluorescent antibody  $CD_3^-$  FITC/ $CD_{16}^+ CD_{56}^+$  -PE and  $CD_{19}^-$  cy5. After mixing well, incubate for 20

minutes in the dark at room temperature, add 1 mL of hemolysin (diluted at 1:10) to each tube, place in the dark until transparent, centrifuge at 1000 r/min for 5 minutes, discard the supernatant, add 1 mL of PBS to wash the cells twice, and finally add 500 µL of PBS solution to mix well, Upper flow cytometer (Partec, Germany) detection. With  $CD_3^+ T$  as total T cells,  $CD_3^+ CD_4^+ T$  cells as helper T cells,  $CD_3^+ CD_8^+ T$  as suppressor T cells,  $CD_3^+ CD_{16}^+ CD_{56}^+$  as NK cells, and  $CD_{19}^+$  as B cells, analyze the percentage of each lymphocyte subgroup.

### Measurement of related physical health indicators

The examination includes heart rate, blood pressure, body mass, height, and body mass index (BMI), all of which are performed after the health function test (the center rate measurement is measured at intervals of 10 minutes after 30 minutes of silence, for a total of 3 times, and the blood pressure measurement person chooses not to take the drug is taken voluntarily by the elderly and the time interval is the same as the heart rate measurement method).

### Statistical methods

We used SPSS16.0 software for statistical analysis. The measurement data were expressed by or the median. The test level was  $\alpha = 0.05$ , and the F test performed the comparison of the means between multiple groups.  $P < 0.05$  indicates that the difference is statistically significant. To study the IBF algorithm of standard regression, mean change point estimation under the conjugate prior, we take the following prior distribution:

$$\begin{aligned} \beta_1 | \sigma^2 &\sim N(\mu_1, \sigma^2 D_1), \beta_2 | \sigma^2 \sim N(\mu_2, \sigma^2 D_2) \\ \sigma^2 &\sim IG(a/2, b/2), r \sim U(p, \dots, n-p) \end{aligned} \quad (1)$$

Among them  $\mu_1, \mu_2$  is a p-dimensional constant vector,  $D_1, D_2$  is a p-order positive definite matrix, and  $IG(a/2, b/2)$  is an inverse gamma distribution with parameters  $a/2$  and  $b/2$ . It is assumed that  $\beta_1, \beta_2$  is  $\sigma^2$  independent of conditions and that  $(\beta_1, \beta_2, \sigma^2)$  and r are independent of each other. Joint posterior distribution of parameter  $(\beta_1, \beta_2, \sigma^2, r)$ :

$$\begin{aligned} \pi(\beta_1, \beta_2, \sigma^2, r | y) &= L(\beta_1, \beta_2, \sigma^2, r | y) \pi(\beta_1 | \sigma^2) \pi(\beta_2 | \sigma^2) \pi(\sigma^2) \pi(r) \\ &= \prod_{i=1}^r \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(y_i - x_i^T \beta_1)^2}{2\sigma^2}} \prod_{i=r+1}^n \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(y_i - x_i^T \beta_2)^2}{2\sigma^2}} \times \\ &\quad \frac{1}{(2\pi)^{p/2} |\sigma^2 D_1|^{p/2}} e^{-\frac{(\beta_1 - \mu_1)^T D_1^{-1} (\beta_1 - \mu_1)}{2\sigma^2}} \frac{1}{(2\pi)^{p/2} |\sigma^2 D_2|^{p/2}} e^{-\frac{(\beta_2 - \mu_2)^T D_2^{-1} (\beta_2 - \mu_2)}{2\sigma^2}} \\ &\quad \times \left(\frac{b/2}{\sigma^2}\right)^{\frac{a}{2}} \frac{1}{\Gamma(\frac{a}{2})} e^{-\frac{b}{2\sigma^2}} \times \frac{1}{n-2p+1} I(p \leq r \leq n-p) \end{aligned} \quad (2)$$

Therefore, the conditional posterior distribution of the change point position r is:

$$\pi(\beta_1, \beta_2, \sigma^2, y) \propto \pi(r, \beta_1, \beta_2, \sigma^2, y) \propto \exp \quad (3)$$

$$\left\{ - \frac{\sum_{i=1}^r (y_i - x_i^T \beta_1)^2 + \sum_{i=r+1}^n (y_i - x_i^T \beta_2)^2}{2\sigma^2} \right\} I(p \leq r \leq n-p) \quad (4)$$

This distribution is the same as formula (4) and has nothing to do with selecting the prior distribution. and:

$$\pi(\theta_1, \theta_2, \sigma^2 | r, y) = \pi(\theta_1 | \sigma^2, r, y) \pi(\theta_2 | \sigma^2, r, y) \pi(\sigma^2 | r, y) \quad (5)$$

## RESULTS

### Basic situation analysis

The people's choice of exercise items from high to low are walking/jogging, Tai Chi/Tai Chi sword, Ba Duan Jin of Health Qigong, Yi Jin Jing of Health Qigong, and Wu Qin Xi of Health Qigong.<sup>6</sup> The overall average levels of blood pressure and BMI between each exercise group and the minimal exercise group are different, and the difference is statistically significant ( $P < 0.05$ ). The minimal exercise group systolic blood pressure (SBP), diastolic blood pressure (DBP), and BMI levels were higher than each exercise group.

### Multidimensional Psychological Analysis

The cross-cut test's overall average level between each exercise group and the minimal exercise group is different, and the difference is statistically significant ( $P < 0.05$ ). The difference between middle-aged and older adults in different exercise groups is statistically significant in the word-marking test.<sup>7</sup> Health Qigong Wuqinxi exercise has the highest average value on this test, which shows that the Health Qigong Wuqinxi exercise positively affects the concentration and intellectual development of middle-aged and older people. (Table 1)

The overall average level of the Raven test between each exercise group and the minimal exercise group is different, and the difference is statistically significant ( $P < 0.05$ ). The Health Qigong Wuqinxi group has the highest average value in this test, indicating that Health Qigong Wuqinxi can delay people's intelligence. The recession has a positive effect. (Table 2)

The overall average scores of mood levels between the exercise groups were different, and the differences were statistically significant ( $P < 0.05$ ). The Taijiquan/Taijijian group had the lowest scores for inactivity, excitement, and anger, and depression scores. The total average score, number of positive items and somatization, depression, paranoia, horror, hostility, and psychosis between each exercise group and the minimal exercise group are different in the overall average level of SCL-90 scores, and the difference is statistically significant. Significance ( $P < 0.05$ ), the total average score, upbeat number, somatization, obsessive-compulsive symptoms, the anxiety of the psychological test scores of the minimal exercise group were all higher than those of each exercise group.<sup>8</sup> Traditional sports health care can improve subjective physical discomfort Sensation, alleviate the symptoms of schizophrenia, and increase the interest and desire of life. Health function test results.

The overall average percentage levels of  $CD_3^+T$ ,  $CD_4^+T$ , NK and NK cells were different between each exercise group and the minimal exercise group, and the difference was statistically significant ( $P < 0.05$ ). The minimal exercise group  $CD_3^+T$ ,  $CD_4^+T$ , NK, and NK levels were lower than the exercise group. Taijiquan group  $CD_4^+T\%$ ,  $CD_8^+T\%$ , NK, and NK cells have the highest overall average percentage level, and Health Qigong Baduanjin  $CD_4^+T\%$   $CD_8^+T\%$  has the highest level. Table 3 shows that physical exercise has a benign regulatory effect on the human immune system.

**Table 1.** Results of the cross-writing test for each group of people.

Group	N	Crossword test	F	P
Tai Chi/Tai Chi Sword Group	67	18.07±2.29	2.67	<0.05
Health Qigong Baduanjin Group	19	16.72±2.71		
Health Qigong Yijinjing Group	27	19.22±2.88		
Health Qigong Wu Qin Xi Group	33	23.15±3.32		
Walking/jogging group	81	16.14±2.53		
Minimal exercise group	135	15.35±3.67		

**Table 2.** Results of the Raven Test for each group.

Group	N	Raven Test	F	P
Tai Chi/Tai Chi Sword Group	67	4.48±0.69	2.85	<0.05
Health Qigong Baduanjin Group	19	5.00±0.54		
Health Qigong Yijinjing Group	27	4.92±0.58		
Health Qigong Wu Qin Xi Group	33	3.24±0.32		
Walking/jogging group	81	2.69±0.36		
Minimal exercise group	135	3.88±0.59		

**Table 3.** Comparison of immune indicators in each group.

Immune index	$CD_3^+T$	$CD_4^+T$	$CD_8^+T$
Tai Chi/Tai Chi Sword Group	66.86±4.97	49.96±5.50	24.31±4.53
Health Qigong Baduanjin Group	69.16±4.64	46.36±5.38	26.01±4.23
Health Qigong Yijinjing Group	65.16±4.37	40.57±5.30	23.05±4.47
Health Qigong Wu Qin Xi Group	64.67±4.72	42.03±5.48	24.94±4.66
Walking/jogging group	63.16±4.72	45.13±5.74	22.01±4.03
Minimal exercise group	60.16±4.13	36.94±4.83	19.01±3.73
F value	2.32	2.46	2.16
Immune index	IgG	IgA	NK
Tai Chi/Tai Chi Sword Group	12.77±2.32	2.59±0.83	49.81±8.11
Health Qigong Baduanjin Group	11.67±1.59	2.73±0.73	43.17±8.40
Health Qigong Yijinjing Group	12.19±2.10	2.51±0.69	35.98±6.33
Health Qigong Wu Qin Xi Group	13.07±1.77	2.09±0.59	38.79±6.50
Walking/jogging group	11.27±1.43	2.29±0.73	37.07±8.52
Minimal exercise group	13.64±1.94	2.98±0.73	28.17±8.17
F value	2.23	2.15	3.31

## DISCUSSION

Traditional Chinese sports, represented by Tai Chi and Health Qigong, are well developed in the community. Existing studies have shown that traditional sports impact the cardiovascular system, bone metabolism, respiratory system, endocrine system and other major organ systems. An apparent fitness effect, such as Tai Chi exercise, can delay aging by improving the body's immune function. However, few studies on the effects of traditional sports on human mental health and immune system, and various opinions differ.

This study conducted preliminary research and observation of traditional health sports on psychological and immunological indicators. After comprehensively analyzing and observing the data results, the author believes that the exercise group's positive psychological-physiological-immune effects can be summarized into the following aspects.

Walking/jogging has a significant effect on controlling depression. The reason may be that walking and jogging are simple and easy, without restriction, and the amount of activity can be controlled and adjusted by oneself. And running can increase hormone levels in the body, help eliminate people's depression and reduce depression.

Tai Chi/Tai Chi sword has the best psychological effect on middle-aged and older people. It is manifested explicitly in its regulation of middle-aged and elderly negative emotions, such as anger and depression, which can improve vitality and mental health. The reason may be related to the characteristics of the project. The movements are completed in one go, coherent and continuous. It needs reasonable control and balance ability to promote the brain. The function of nerve cells is perfect, strengthening the brain's regulation ability and has a good effect on the prevention of Alzheimer's disease.

Health Qigong Wuqinxi has more effective effects on attention concentration and intelligence than other exercise programs; it also has better effects on activity, pleasure, and calmness. Compared with other exercise groups, Health Qigong Ba Duan Jin's regulation effect on the people's calm and the pleasure of Yi Jin Jing on the middle-aged

and elderly is more pronounced, which shows that Health Qigong has a particular two-way psychological regulation effect. Scientific physical exercise has a benign effect on human immune function.

## CONCLUSION

This research further shows that the impact of any kind of exercise on mental, physical and immune function is not comprehensive. People can try various sports to obtain a comprehensive psychological

and physical health effect. Due to sample content limitation and personnel training time, this study did not carry out long-term follow-up observation for the population as mentioned above. It is hoped that the research in related fields can be further improved in future research.

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All authors declare no potential conflict of interest related to this article

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