

# The effect of *Health Qigong-Yi Jin Jing* exercises on the intervention of common chronic diseases in middle-aged and elderly people

## Authors' Contribution:

- A Study Design
- B Data Collection
- C Statistical Analysis
- D Manuscript Preparation
- E Funds Collection

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## Abstract

### Background and Study Aim:

*Health Qigong-Yi Jin Jing* is a traditional national sport in China that combines physical activity, breathing and psychological adjustment as the main form of exercise. The aim of this study was knowledge about the effect of precise exercise of *Health Qigong-Yi Jin Jing* on the rehabilitation (therapy) of common chronic diseases in the middle-aged and elderly people.

### Material and Methods:

Tested the complete exercise of *Health Qigong-Yi Jin Jing* and the exercise time, exercise frequency and exercise intensity of each style. Total 120 people were randomly divided into groups: 66 in the experimental group (EG) and 54 in the control group (CG). At the same time, basic Chinese medicine for sub-healthy people syndrome epidemiological investigation, master the basic conditions of common chronic diseases, with cervical spondylosis, constipation, gastritis, insomnia, and lumbar muscle strain as the main observation contents. According to the chronic disease status of the EG, 6 exercise prescriptions were formulated. On the basis of the exercises, precise exercises were carried out; the CG only practiced the whole set of exercises, and underwent 12 months of experimental observation and statistical analysis.

### Results:

There was no significant difference in the three indicators of age, height, and weight between the two groups of subjects. Through the test, 4 obvious peaks occurred within 13 minutes and 10 seconds, and the heart rate (HR) trend gradually changed from low to high. The lowest HR was 68 beats per minute, the highest heart rate was 107 beats per minute, and the average HR was 92 beats per minute. The energy consumption is 48 calories, which meets the requirements of aerobic exercise and fitness. It embodies the characteristics of *Health Qigong-Yi Jin Jing* meridian to open and close the *qi*, rotate flexion and extension, stretch, internal organs and joints. Combining the common chronic diseases of the subjects, the effect was observed for 12 months. The improvement rate of the EG was 74.10% for lumbar muscle strain, 69.20% for insomnia, 68.50% for cervical spondylosis, 60.20% for constipation and 57.42% for gastritis. The improvement rate was 52.20% for lumbar muscle strain, 50.30% for cervical spondylosis, 50.10% for insomnia, 44.50% for gastritis, and 41.50% for constipation.

### Conclusions:

The HR fluctuations of *Health Qigong-Yi Jin Jing* exercises are all within the range of aerobic exercise, which is in line with the physiological laws of fitness for middle-aged and elderly people. The test results show that the movement structure, exercise intensity, Exercise time and exercise frequency are reasonable; exercise prescriptions for middle-aged and elderly people are reasonable and effective; it has significant fitness effects on common chronic diseases such as cervical spondylosis, lumbar muscle strain, insomnia, constipation, and gastritis. The effects of EG is better than the CG with significant differences.

### Key words:

cervical spondylosis • constipation • gastritis • insomnia • lumbar muscle strain

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Authors have declared that no competing interest exists

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**Exercise** – noun **1.** physical or mental activity, especially the active use of the muscles as a way of keeping fit, correcting a deformity or strengthening a part **2.** a particular movement or action designed to use and strengthen the muscles ■ verb **1.** To undertake physical exercise in order to keep fit and healthy **2.** to subject the body, or part of it, to repetitive physical exertion or energetic movement in order to strengthen it or improve [17].

**Technique** – noun a way of performing an action [17].

**Physical activity** – noun exercise and general movement that a person carries out as part of their day [17].

**Exercise intensity** – in order to improve physical fitness, exercise must be hard enough to require more effort than usual. The method of estimating appropriate training intensity levels varies with each fitness component. Cardiovascular fitness, for example, requires elevating the heart-rate above normal [18].

**Qigong (qi gong, chi kung, or chi gung)** – (traditional Chinese: pinyin: qigōng; Wade-Giles: chi gong; literally: "Life Energy Cultivation") is a holistic system of coordinated body posture and movement, breathing, and meditation used for health, spirituality, and martial arts training. With roots in Chinese medicine, philosophy, and martial arts, qigong is traditionally viewed as a practice to cultivate and qibalance(chi), translated as "life energy" [Wikipedia].

## INTRODUCTION

*Health Qigong* is the 63rd sports event officially launched and promoted by the State Sports General Administration. After 2001, "Wu Qin Xi", "Ba Duan Jin", "Liu Zi Jue", "Yi Jin Jing", "Twelve Methods of Guiding", "Twelve Duan Jin", "Da Wu", "Mawangdui Guiding Technique" were successively launched. "Tai Chi Health Stick" and other guiding exercises [1].

*Health Qigong-Yi Jin Jing* is one of its main contents, "yi" means flexibility, change, and removal; "jin" refers to muscles and fascia; "Jing" It's a guide, a classic method. The principle comes from "yi", law is from "yin and yang", with looseness, tightness, virtuality, reality, rigidity, softness, fastness, slowness, strongness, weakness, etc., transforming each other. The characteristic exercise method [2] has now spread all over the world. According to statistics, there are more than 6 million people practicing in China, and it is very suitable for the elderly to practice. The research on the techniques of exercises is also applied to the elderly [3].

The middle-aged and elderly practitioners account for 80%. The main motivation is fitness and rehabilitation of chronic diseases; practicing *Health Qigong* can improve the performance of physical training and improve the state of chronic diseases [4]. Therefore, study the exercise intensity, exercise frequency, exercise time, energy consumption and precautions of exercises of *Health Qigong-Yi Jin Jing*, and formulate corresponding exercise prescriptions according to the physiological characteristics of middle-aged and elderly people and the different physiques of the practitioners, which will improve Practicing the fitness effects of *Health Qigong-Yi Jin Jing*, avoiding sports injuries, highlighting the fitness function of *Health Qigong* [5], provides theoretical basis and fitness guidance for exploring scientific quantitative and precise exercise, and is conducive to the scientific development of *Health Qigong*. *Health Qigong-Yi Jin Jing* is a traditional national sport that combines physical activity, breathing, and psychological adjustment as the main form of exercise [6].

There are 12 main movements, plus the starting and closing movements and 14 poses, each of which can be practiced separately. There are 10 commonly used combined practice methods. The exercise intensity, heart rate change, psychological adjustment, and breathing rhythm of each method are different. Therefore, according to the physiological characteristics of middle-aged and elderly people in addition to the characteristics of *Health Qigong-Yi Jin Jing*, it is of practical value to study exercise prescriptions that practitioners recombine their movements according to their own needs.

The aim of this study was knowledge about the effect of precise exercise of *Health Qigong-Yi Jin Jing* on the rehabilitation (therapy) of common chronic diseases in the middle-aged and elderly people.

## MATERIAL AND METHODS

### Participants

The experimental group (EG) consisted of middle-aged and elderly people aged 45 to 75 who participated in *Health Qigong-Yi Jin Jing* exercises in Luxiang Community, Wuhan City, Hubei Province, China for 12 months. Among them, before the experiment, there were 30 males and 36 females, a total of 66 people; 61 people after the experiment, and 5 people dropped out; there were 24 males and 30 females, a total of 54 people, 49 people after the test, and 5 people dropped out. There are a total of 120 samples in the two groups (Table 1). The subjects voluntarily signed up and did not learn or practice *Health Qigong-Yi Jin Jing* before the experiment. Health status: if the subject is found to have organic heart disease after inquiring about the medical history, the data will be marked and eliminated in the data analysis. The two communities are adjacent, and the living habits and living area environment are the same. There is no significant difference in age, height, weight, learning ability and exercise ability between the two groups.

**Table 1.** Basic conditions of subjects.

Male (n = 54)				Female (n = 66)			
45~60 years		61~75 years		45~60 years		61~75 years	
before	After	Before	after	before	After	before	After
<b>Test group (number and average age/years)</b>							
12	10	18	17	16	15	20	19
54.8	54.7	65.8	65.5	51.5	51.7	63.2	63.5
<b>Control group (number and average age/years)</b>							
11	10	13	12	14	13	16	14
54.4	54.1	65.6	65.7	51.7	51.4	63.7	63.8

## Study design

### Instruments

Use Polar multi-function heart rate monitor (model: RS610 heart rate telemeter, Finland), intelligent standard height and weight scale (model hxhsg100, China).

### Intervention process and requirements

(1) Testing experiment design: before the formal experiment, use independent samples to test the experimental design, and perform quantitative cardiac stress function test of the subjects, that is, the subjects rest for 5 minutes, exercise for 3 minutes, and rest for 3 minutes, and use Polar610 multifunctional heart rate monitor to monitor and record the exercise process. Record the resting heart rate (HR) before exercise, the highest HR during exercise, the heart rate immediately after exercise, and the HR 3 minutes after exercise.

(2) Location and time: the test site and practice site are at the *Health Qigong* site in Luxiang, Wuhan City, Hubei Province, monitored by the experimental group of Wuhan Institute of Physical Education. The subjects first received one week of *Health Qigong·Yi Jin Jing* exercises training, and after they mastered the movements, they began to formally monitor and practice. From March 8, 2018 to March 8, 2019, it is the time for learning and practicing. Every morning at 6:30 to 7:30, practice for 60 minutes. The practice time is relatively fixed.

(3) Monitoring indicators: the instant HR of *Health Qigong·Yi Jin Jing* exercises, to understand the exercise intensity, exercise time, and exercise frequency of *Health Qigong · Yi Jin Jing*, so as to provide a basis for formulating exercise prescriptions for *Health Qigong · Yi Jin Jing*.

At the same time, an epidemiological survey of the basic Traditional Chinese Medicine Syndrome (TCM syndromes) of sub-healthy people was carried out to observe the fitness effect of the EG and the CG.

(4) Monitoring and practice requirements: the testers, test instruments, test indicators, and test locations are the same before and after the practice. All subjects received a week's training in the basic movements of *Health Qigong·Yi Jin Jing*. After the subjects mastered the full set of *Health Qigong·Yi Jin Jing* exercises, the EG practiced the exercise prescription of *Health Qigong ·Yi Jin Jing* according to their physical fitness; The whole set of exercises of *Health Qigong·Yi Jin Jing*. During the experiment, all subjects avoided bad mental stimulation and maintained their original lifestyle.

### Exercise time and exercise frequency of physical exercise

Once a day, each time is about 60 minutes. From March 8th, 2018 to March 8th, 2019, it is the study and practice time. Every morning, 6:30-7:30, the practice time is relatively fixed. Tips for exercising.

### Precautions for exercise

The subjects participating in the exercise are required to not be absent for no reason, and actively participate in the exercise; the range and intensity of exercise should be increased from small to large to avoid sports injuries; during the experiment, keep the living habits relatively stable, and at the same time Practitioners explain how to achieve psychological self-rescue during the onset of disease and reduce the aggravation of the onset of the disease caused by psychological factors [7].

### Statistics analyses

After completing the experiment, use Microsoft Visual FoxPro ver. 6.0 to eliminate the wrong or repeated samples, and then use MATLAB ver. 7.0 and IBM SPSS ver. 19.0 to process the processed data. All data are expressed as mean, standard deviation (SD or  $\pm$ ), independent sample t test is used for comparison between groups, and the significance level is set to  $\alpha = 0.05$ .

## RESULTS

### Frequency, time and intensity test of Health Qigong-Yi Jin Jing exercises

Test the real-time intensity, time, and frequency of one exercise of *Health Qigong-Yi Jin Jing*, and use real-time HR changes as an indicator to provide a reliable basis for formulating exercise prescriptions.

### Movement frequency and time of Health Qigong-Yi Jin Jing exercises

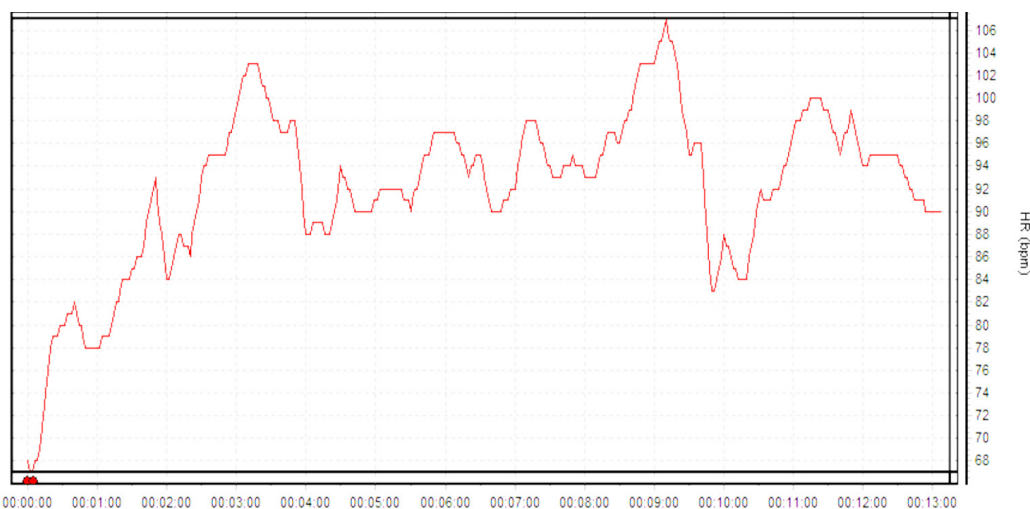
In a relatively quiet state, practice with the *Health Qigong-Yi Jin Jing* password word music as the guide. The exercise route is required to be standardized, the action essentials are accurate, and the breathing and mental activities are coordinated to test the changes in HR. The time of the password is 12 minutes and 48 seconds, due to changes in HR, generally lags behind the action by 10 to 20 seconds. Therefore, the test uses 13 minutes and 10 seconds as the practice time, the time and frequency of the action (Table 2).

### The real-time HR changes after one exercise of Health Qigong-Yi Jin Jing

Heart rate changes are a response to exercise intensity. Through the test, 4 obvious peaks occurred within 13 minutes and 10 seconds. At 3 minutes and 15 seconds, using *dao zhuai jiu niuwei shi*

**Table 2.** Action frequency and time correspondence table of *Health Qigong-Yi Jin Jing*.

Action name	Time	Action name	Time
<i>yu bei shi</i>	00:04	<i>7 jiu gui ba ma dao shi</i>	04:11
<i>1 wei tuo xian chu di yi shi</i>	00:35	<i>8 san pan luo di shi</i>	05:55
<i>2 wei tuo xian chu di er shi</i>	00:49	<i>9 qing long tan zhao shi</i>	06:48
<i>3 wei tuo xian chu di san shi</i>	01:15	<i>10 wo hu pu shi shi</i>	07:54
<i>4 zhai xing huan dou shi</i>	01:37	<i>11 da gong shi</i>	08:38
<i>5 dao zhuai jiu niu wei shi</i>	02:05	<i>12 diao wei shi</i>	10:15
<i>6 chu zhao liang chi shi</i>	03:04	<i>shou shi</i>	11:34



**Figure 1.** The curve of instant heart rate changes during the exercise of *Health Qigong-Yi Jin Jing*.

and *chu zhao liang chi shi* as the main movements caused the HR to increase, forming the first peak, and the HR reached 103 beats per minute; at 6 minutes, *san pan luo di shi* formed the second peak of the main action, with a HR of 97 beats per minute; at 9 minutes, *wo hu pu shi shi. Da gong shi* formed the third wave peak for the main action, and the HR reached 107 beats per minute; at about 11 minutes, the main action formed the fourth wave peak with *diao wei shi*, and the HR reached 100 beats per minute, and the time was longer. Long, instant HR change curve (Figure 1).

Within 13 minutes and 10 seconds, the HR has 4 significant peaks, and the trend of the HR changes gradually from low to high, and each peak time is long. This is in line with *Health Qigong-Yi Jin Jing's* dance recommendation, opening and closing, stretching The characteristics of drawing long, internal organs, and moving joints.

**The distribution of heart rate changes and energy consumption during one exercise of Health Qigong-Yi Jin Jing**

When testing the HR, record it every 5 seconds, and form a list of HR changes from the beginning to the end, see (Table 3). Statistics on the HR change list shows that the fluctuation of the HR is within the normal range, which meets the requirements of aerobic exercise and fitness. The HR of 60~80 per minute is 26 seconds,

accounting for 3%; the rate of HR is 80~100 per minute. The HR is 11 minutes and 40 seconds, accounting for 89%; the HR of 100 to 120 per minute is 1 minute and 2 seconds, accounting for 8% (Figure 2).

The lowest HR is 68 beats per minute, the highest HR is 107 beats per minute, the average HR is 92 beats per minute (Table 2 & 3, Figure 1 & 2), and the energy consumption is 48 calories (Table 4).

Since the HR index is instantaneous, manoeuvrable, easy to track and test, and easy to repeat the test, it is an effective indicator that reflects exercise intensity and exercise frequency. Mastering the HR change during exercise and the basic exercise law of this exercise will help improve the effect of exercise, to provide a basis for formulating precise exercise prescriptions.

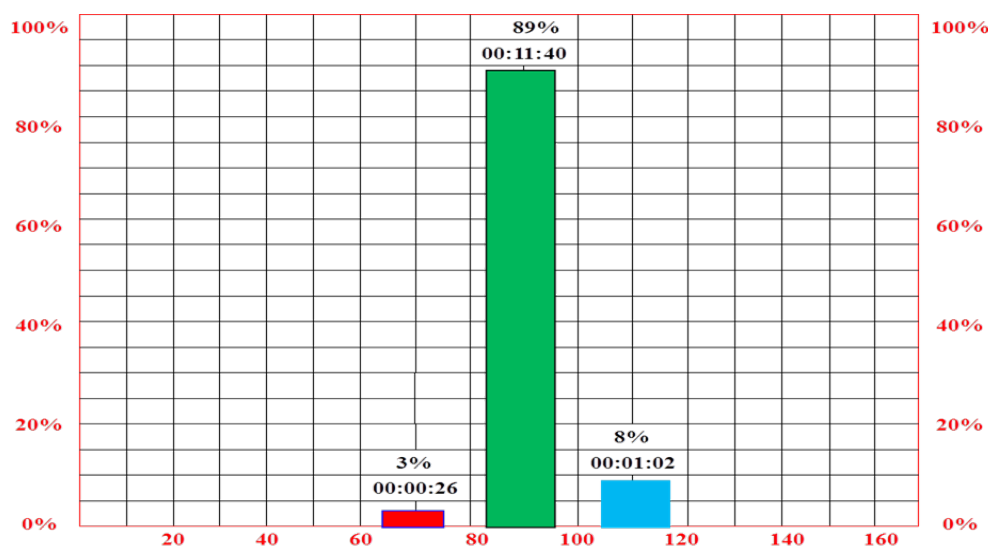
**Exercise prescription for intervention of common chronic diseases in middle-aged and elderly people**

**The purpose of exercise prescription**

With the increase of age, chronic diseases have become diversified and complicated. In order to improve the prevention and rehabilitation effects, precise exercise prescriptions are very necessary to promote the health of middle-aged and elderly people.

**Table 3.** List of real-time heart rate changes during the exercise of *Health Qigong-Yi Jin Jing*.

Time	+0:00	+0:05	+0:10	+0:15	+0:20	+0:25	+0:30	+0:35	+0:40	+0:45	+0:50	+0:55
0:00:00	68	68	69	74	78	79	80	81	94	93	94	96
0:01:00	78	79	79	82	83	84	85	86	87	91	93	88
0:02:00	84	86	88	87	86	90	93	95	95	96	96	97
0:03:00	99	102	103	103	102	100	99	98	97	98	98	92
0:04:00	88	89	89	88	88	91	94	92	91	90	90	91
0:05:00	91	92	92	92	92	91	90	93	94	95	97	97
0:06:00	97	97	96	95	93	95	95	92	90	90	91	92
0:07:00	92	96	98	98	97	95	94	93	93	94	95	94
0:08:00	93	93	93	95	97	97	96	98	99	102	103	103
0:09:00	103	105	107	105	103	98	95	96	96	88	83	85
0:10:00	88	86	85	84	84	88	91	91	91	92	93	95
0:11:00	97	98	99	100	100	99	99	97	95	97	99	96
0:12:00	94	95	95	95	95	94	95	93	92	91	91	90
0:13:00	90	90	90	0	0	0	0	0	0	0	0	0



**Figure 2.** Heart rate distribution diagram during exercise of *Health Qigong-Yi Jin Jing*.

### Types of exercise prescription

There are 12 main movements in *Health Qigong-Yi Jin Jing*, plus 14 movements in starting and closing positions. The number of starting movements is 1; the number of movements in the first position of *wei tuo xianchu* is 2; the number of *wei tuo's* first position is 2; the action number of the second posture is 3; the action number of the third posture of *wei tuo* presents the pestle is 4; the action number of the star-catching and change-fighting posture is 5; the action number of the nine bull's tail posture is 6; the number is 7; the action number of the nine ghosts pulling the horse sword posture is 8; the action number of the three landing posture is 9; the action number of the blue dragon claw probing posture is 10; the action number of the *crouching tiger* rushing posture is 11; the bowing posture action the number is 12; the action number of the drop-off trend is 13; the action number of the closing trend is 14. According to the purpose of exercise, the characteristics of *Health Qigong-Yi Jin Jing*, the function of action, exercise time, movement frequency, exercise intensity and movement number,

the following *Health Qigong-Yi Jin Jing* are suitable for the type of exercise for middle-aged and elderly people (Table 5).

The six kinds of exercise prescriptions all use starting and ending methods to ensure the integrity of exercise prescriptions. On the basis of mastering the action intensity, exercise time, exercise frequency and energy consumption of the action, combined with the theory of zang-fu viscera and syndrome differentiation and treatment of traditional Chinese medicine, for example, for the exercisers with emotional excitement and hypertension, the spirit of *Wei tuo xian chu di san shi* is combined with the *qing long tan zhao shi* to regulate the "liver fire", so that the mood of the exercisers is calm and blood pressure drops slowly; If the exerciser suffers from lumbar muscle strain, use *dao zhui jiu niu wei shi* to rub the waist left and right, relax the waist joints, and cooperate with *Dao wei shi* to enhance the strength of the lumbar muscle; If the exerciser is suffering from shoulder peri-arthritis caused by "wind cold", use

**Table 4.** Heartbeat index and energy expenditure during the exercise of *Health Qigong-Yi Jin Jing*.

Data	Numerical	Unit	Data	Numerical	unit
duration	0:13:10	s	sampling ratio	5	s
energy consumption	48	kcal	average HR	92	bpm
minimum HR	68	bpm	SD	9.2	bpm
maximum HR	107	bpm			

**Table 5.** Health Qigong-Yi Jin Jing meets the types of exercise prescriptions for middle-aged and elderly people.

Type Number	Types of exercise prescription	Action composition	Main effect
(1)	calm class	1+2+10+14	calm mood, relax body, lower blood pressure
(2)	power class	1+6+13+14	enhance lumbar muscle strength and prevent lumbar muscle strain
(3)	Flexible	1+4+8+14	promote Yang Qi, prevent neck and shoulder syndrome, frozen shoulder etc.
(4)	Digestive	1+9+11+14	regulate the spleen and stomach, prevent indigestion, constipation and diarrhoea
(5)	insomnia	1+5+12+14	improve blood supply to the brain, prevent insomnia, mental depression etc.
(6)	balance class	1+3+7+14	increase lung capacity and improve balance ability

*jiu gui ba ma dao shi* to raise “yang qi” to remove cold and dampness and promote recovery; If the practitioner is simply constipated, use *wo hu pu shi shi* to promote gastrointestinal peristalsis, if it is caused by the qi deficiency of the spleen and stomach, use *san pan luodi shi* to promote spleen qi rise and stomach qi decline; For long-term insomniacs, use the *zhai xing huan dou shi* to promote the “heart kidney interaction”, cooperate with *da gong shi*, maintaining the brain and improving sleep; if the lung qi deficiency leads to the instability of the center of gravity of the human body, upper heavy and lower light, use *wei tuo xian chu di er shi* and *chu zhao liang chi shi*, combined with breathing, requires deep breathing, meticulous, uniform, in order to improve lung function, improve symptoms and so on.

**The amount and intensity of physical exercise**

The subjects in the EG chose the type of exercise in (Table 5) according to their physical needs, of which 10 people chose the exercise type (1), 12 people chose the exercise type (2), and 11 people chose (3) number of sports, 10 people chose (4) sports, 10 people chose (5) sports, 13 people chose (6) sports. Practice continuously for

27 minutes, rest for 5 minutes, and then practice continuously for 27 minutes. Participants in the CG practiced *Health Qigong-Yi Jin Jing* full set of exercises twice for about 29 minutes, rested for 5 minutes, and then practiced twice continuously.

**Comparison results of the improvement rate of common diseases after practice between the experimental group and the control group**

According to the different physiques and health status of the practitioners, the exercise prescriptions for *Health Qigong-Yi Jin Jing* were formulated. The CG participated in the exercises but did not formulate exercise sanctions. After 12 months of practice, the two groups compared the effectiveness of common diseases (Table 6).

**DISCUSSION**

**The physiological characteristics of middle-aged and elderly people**

After a person reaches the age of 40, his physiological function gradually declines. Elderly people have undergone a series of changes in body

**Table 6.** Comparison of the improvement rate of common diseases between the test group and the control group after practice (M±SD).

Indicator	Results (M±SD)			
	Experimental group(n=61)		control group(n=49)	
	number of people	Results	number of people	Results
Cervical spondylosis	15	68.50±1.20*	13	50.30±2.15
Lumbar muscle strain	16	74.10±3.22*	15	52.20±1.33
Insomnia	18	69.20±4.15*	15	50.10±4.62
Constipation	10	60.20±2.32*	12	41.50±2.55
stomach problems	8	57.42±2.08*	10	44.50±2.31

\* p < 0.05

shape and function, which are mainly manifested in the increase in the proportion of inactive parts of the body composition. For example, 65 years old compared with 20 years old have more body fat than body weight. 10-20%; while the water content decreases with age, resulting in a decrease in the amount of intracellular fluid and a decrease in the number of cells and organ atrophy. In terms of digestive function of the elderly, mucosal atrophy and motor function decline.

Over 60 years of age, 50% of them can have gastric mucosal atrophic changes, especially weak intestinal motility, which can easily lead to indigestion and constipation. The digestive glands shrink, the secretion of digestive juice decreases, and the digestive capacity decreases. In terms of nerve tissue function, the number of nerve cells gradually decreases, cerebrovascular sclerosis, cerebral blood flow resistance increases, and the utilization of oxygen and nutrients decreases, resulting in the gradual decline of brain function and the appearance of certain neurological symptoms, such as memory loss, forgetfulness, insomnia, even emotional changes and certain mental symptoms, physical and mental exercises in patients with Parkinson's disease can significantly improve motor function, depression symptoms and quality of life [8].

In terms of cardiovascular function, blood vessels also undergo a series of changes with age. Physiological sclerosis of the blood vessel wall becomes more obvious after the age of 50, the elasticity of the vessel wall decreases, and many elderly people are accompanied by lipid deposition in the blood vessel wall, which makes the elasticity of the blood vessel wall more declining and increasing fragility. As a result, the regulating effect of blood vessels in the elderly decreases, and the peripheral resistance of the blood vessels increases, so that the blood pressure of the elderly often rises. In terms of respiratory function, the elderly due to atrophy of respiratory muscles, thoracic bones, and ligaments, decreased alveolar elasticity, and decreased elasticity of trachea and bronchi, are often prone to frequent alveolar expansion and emphysema, resulting in a significant decrease in vital capacity and lung ventilation. The number is reduced, the effective gas exchange area is reduced, and the efficiency of venous blood's oxygen renewal and carbon dioxide discharge in the lungs is reduced. Professional Qigong exercises can significantly increase the vital capacity of middle-aged and elderly people [9].

Traditional Chinese medicine believes that the lung governs *qi* and regulates breathing. Paying attention to the coordination of breathing and movement in the practice process of Healthy Qigong which can effectively exercise and enhance the function of the lungs [11]. The slowing of blood flow, the decrease of capillaries number and the dysfunction of tissue cells, as well as the change of membranes permeability, can reduce the respiration of cells and the utilization rate of oxygen. Therefore, the prescription exercise of Health Qigong and dance is conducive to delaying aging, targeted disease prevention and rehabilitation, and improving fitness effect

### **The experimental data of *Health Qigong-Yi Jin Jing* on exercise prescriptions for middle-aged and elderly people**

Heart rate is the frequency at which the heart beats within a certain period of time. Heart rate is a non-invasive and reasonable indicator for formulating exercise prescriptions. Through real-time shake measurement of heart rate, the exercise time, frequency and intensity of *Health Qigong-Yi Jin Jing* are mastered, which provides a reliable basis for middle-aged and elderly people to practice *Health Qigong-Yi Jin Jing* (see Figures 1 and 2, Tables 2-4).

Long-term participation in aerobic fitness exercise can increase the tension of the vagus nerve in middle-aged and elderly people [13]. The increased tension of the vagus nerve raises the threshold for ventricular fibrillation, which protects the heart. The *Health Qigong-Yi Jin Jing* belongs to aerobic fitness exercises, which are moderate fitness exercises (see Figure 1, Table 4). The average HR during the exercise process just reaches the target HR range of aerobic fitness exercises for middle-aged and elderly people; targeted Qigong exercise may have a better intervention effect for patients with longer duration of type 2 diabetes [12];

Studies have shown that *Health Qigong* has better fitness effect. The *Health Qigong-Yi Jin Jing* has a good recovery effect on cervical spondylosis, lumbar muscle strain, insomnia, constipation, and gastritis (see Table 6). If you choose the corresponding exercise prescription based on your physical fitness, the fitness effect will be significant. Of course, this is related to the physiological basis. At the same time, it is closely related to the *Health Qigong-Yi Jin Jing* exercises. Through the flexion, extension and pitching of the external limbs and the lifting and closing of the internal *qi*



machine, the muscles and veins of the body can be stretched and stretched, and the meridians can be relaxed. The purpose of “warming yang and dispelling dampness” [13].

Such as *Wei tuo xian chu di san shi*, by lifting both hands, slowly exerting force, and maintaining the extension, the “triple focus” can be unobstructed and the *qi* and blood can be harmonized. It has a good effect on preventing shoulder diseases and preventing cervical spondylosis by lengthening the muscles around the joints of the trunk and upper limbs, as well as the soft tissues of ligaments; *Chu zhao liang chi shi* can stimulate the *du channel* and *shu* points on the back by expanding the shoulders and expanding the chest; The three *yin* and three *yang* of the hand can regulate the *qi* of the meridians such as the taiyin lung meridian of the hand. It can effectively develop the muscle strength of the lower limbs and improve balance and coordination; *Jiugui ba madao shi* twisting and pulling through the spine, which can massage the liver and gallbladder in the spleen and stomach, and can stimulate the abdomen and chest. The related meridians of the ribs, and the *shu* points on the back, to regulate the spleen, stomach, liver and gallbladder, and viscera meridians; *Dao zhui jiu niu wei shi* front and back pulling action, through the rotation of the upper limbs and static stretching, can *expand* and stretch the chest cavity and abdominal cavity.

Viscera – the head-turning action can stimulate the neck *dazhui* points, twist the spine, and achieve the purpose of internal organs. As an important part of non-drug treatment, *Health Qigong* is widely used in the treatment of ankylosing spondylitis [14]; *Diaowei shi*, By swinging the tail lug, the spine can be stimulated and the Ren and Du vessels can be adjusted. During the tail swing, the waist and neck of the spine are greatly laterally bent, turned and turned, which can make the head, neck, waist and abdomen of the entire spine. The hip and thigh muscles are involved in contraction, which not only increases the flexibility of the neck, waist and hip joints, but also strengthens the muscles of these parts. At the same time, the quiet meditation exercises can instantly change emotional perception and emotional regulation related areas, such as the forehead. The activation mode of cortex, insula, cingulate gyrus and limbic system; long-term practice can also change the anatomical structure of the corresponding brain area. These are the neural basis for meditation to effectively

regulate individual emotions and autonomic nervous activities [15], which is conducive to the improvement of sleep; the stretch arm movement of *Qinglong tan zhao shi* can stimulate the spine, the governor channel, the *mingmen* and *yangguan* by bending forward and backward.

The *weizhong* acupoint helps prevent chronic diseases of the genitourinary system and achieves the effect of strengthening the kidney and strengthening the waist; *Wo hu pu shi shi* stimulates the liver meridian, promotes the filling of liver blood, dredging liver *qi*, and strengthens the bones and muscles. Arms extension and other movements can stimulate the blood and governor channels of the three yin, three yang and twelve meridians of the hands and feet; at the same time, the muscles and tendons and veins of the whole body are stimulated by static stretching. Long-term exercise can improve flexibility, coordination and strength. Increase; *Da gong shi* forward flexion of the spine, the toes are the intersection of the three yin and three yang meridians of the foot. The ten toes of the feet grip the ground, which can stimulate the meridians of the feet and regulate the functions of the corresponding viscera; at the same time, it can stimulate the spine and the governor meridian, so that the *qi* and blood of the viscera and meridians of the whole body are unobstructed. Yin and Yang balance. Therefore, for the special group of the elderly, we should create personalized fitness prescriptions for the elderly, improve service quality, and optimize service models [16]. Based on the above analysis, formulating exercise prescriptions for *Health Qigong·Yi Jin Jing* for different chronic diseases is pertinent and effective to improve fitness effects.

## CONCLUSIONS

Heart rate fluctuations in *Health Qigong·Yijin Jing* exercises are all within the aerobic exercise range, which is in line with the physiological laws of fitness for middle-aged and elderly people.

The test results show that the movement structure, exercise intensity, exercise time, and exercise frequency of *Health Qigong·Yi Jin Jing* exercises are reasonable.

Through comparative observation between the experimental group and the control group, *Health Qigong·Yi Jin Jing* exercises have significant

fitness effects for common chronic diseases such as cervical spondylosis, lumbar muscle strain, insomnia, constipation, and gastritis. The experimental group is better than the control group with significant differences. It is reasonable and effective to formulate exercise prescriptions for middle-aged and elderly people.

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