



## Research Article

# Effects of Medical Qigong on Plasma Cortisol in Healthy Adults: A Pilot Randomized Clinical Trial

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### Abstract

**Background:** In recent years, qigong has attracted attention in the medical field for its use as mental management therapy. This study's aim was to examine our medical qigong's effects on stress in healthy adults by evaluating plasma cortisol.

**Methods:** In a pilot randomized controlled clinical trial, 28 people were randomly assigned to either the medical qigong group or the control group, and blood tests were performed before and after treatment. We used our original medical qigong treatment method.

**Results:** The medical qigong group's plasma cortisol was  $11.8 \pm 4.3$   $\mu\text{g/dL}$  before treatment and  $8.8 \pm 2.5$   $\mu\text{g/dL}$  after treatment, showing a significant difference. In contrast, the control group's plasma cortisol was  $12.3 \pm 7.1$   $\mu\text{g/dL}$  before treatment and  $10.8 \pm 6.6$   $\mu\text{g/dL}$  after treatment, with no significant difference. All procedures were performed safely. There were no significant differences in the amount of change in measurement factors other than cortisol.

**Conclusion:** Our medical qigong significantly reduced plasma cortisol in healthy adults in the short term. These results suggest that medical qigong can relieve modern people's stress.

**Keywords:** Medical Qigong; Plasma Cortisol; Stress; Mental Management

### Introduction

Many reports, including experimental, clinical and epidemiological studies, have demonstrated that stress is associated with the onset and progression of diseases. Stress

can be caused by many factors, including changes in living environment, social pressure and relationship problems. It increases the risk for chronic diseases, such as anxiety, depression, hypertension, heart disease, diabetes and obesity, leading to a decline in quality of life [1-3]. Therefore, in modern society, various methods have been used to alleviate or prevent stress. Qigong is a traditional health practice that

originated in China and is reported to effectively relieve stress. The basic elements of qigong are breathing techniques, body movements, visual and sensory images, etc. Combining these elements achieves a mind– body balance [4-6]. In recent years, qigong has been attracting attention in the medical field, and it is used as a complementary therapy for cancer treatment, stress relief and type 2 diabetes, etc., as “medical qigong” [7-10]. However, there are various medical qigong methods, depending on the practitioner and culture; no consensus has been reached. Awareness of medical qigong is low, especially in Japan; there are no reports of randomized controlled trials evaluating stress relief associated with medical qigong using blood tests. This study’s purpose was to examine our medical qigong method’s effects on stress in healthy subjects by evaluating plasma cortisol in a pilot randomized controlled trial.

**Materials and Methods**

This study was a prospective, randomized, single blind (subjects were blinded), blinded-endpoint, parallel-group, controlled clinical trial conducted at a single center from December 2021 to May 2023 (University Hospital Medical Information Network identifier: UMIN000046305). The protocol was based on the Declaration of Helsinki and approved by the Haneginomori Eye Clinic Ethics Committee (IRB number: 21001). We invited 40 subjects and enrolled 28 (aged 36-59 years) with no underlying

disease. These subjects did not include individuals who had previously received medical qigong treatment. All subjects were adults who could stand for 20 min or more and provided consent after receiving our sufficient explanation about participating in this study. Table 1 shows acupuncture points used in our medical qigong method, which included the following five steps:

1. Medical interview (Figure 1a).
2. Relieve mental and physical tension in the supine position. The practitioner gently touches four acupuncture points (Hyakue, Indo, Mizoochi and Tanden), which requires approximately 10 to 15 min (Figure 1b).
3. Maintain a distance of approximately 100 cm from the standing subject, and transmit the qigong energy emitted from the practitioner’s hands to the subject’s brainstem and frontal lobe, which requires approximately 10 min (Figure 1c).
4. The practitioner transmits qigong energy around the Ninmyaku acupuncture point for approximately 5 min while the subject is seated (Figure 1d).
5. Transmit energy into the governor vessel meridian (Tokumyaku) for approximately 5–10 min while the subject is standing (Figure 1e).
6. Each subject’s treatment was approximately 40 min duration. Subjects in both groups were blindfolded and under the same conditions. This study’s procedures were performed by only one specialist with more than 20 years of experience.

Name	Descriptions
Tokumyaku	The posterior meridian of the body through which external energy flows is called the governor vessel (GV).
Ninmyaku	The anterior meridian of the body through which internal energy flows is called the conception vessel (CV).
Hyakue	The 20th point of GV (GV20). The intersection of the line connecting the highest points of both ears and the line connecting the nose to the center of the back of the head.
Mizoochi	The 15th point of CV (CV15). Epigastric region.
Tanden	10 cm below the navel.
Indo	Slightly sunken area between the eyebrows

**Table 1:** Definitions of acupuncture points and meridians.



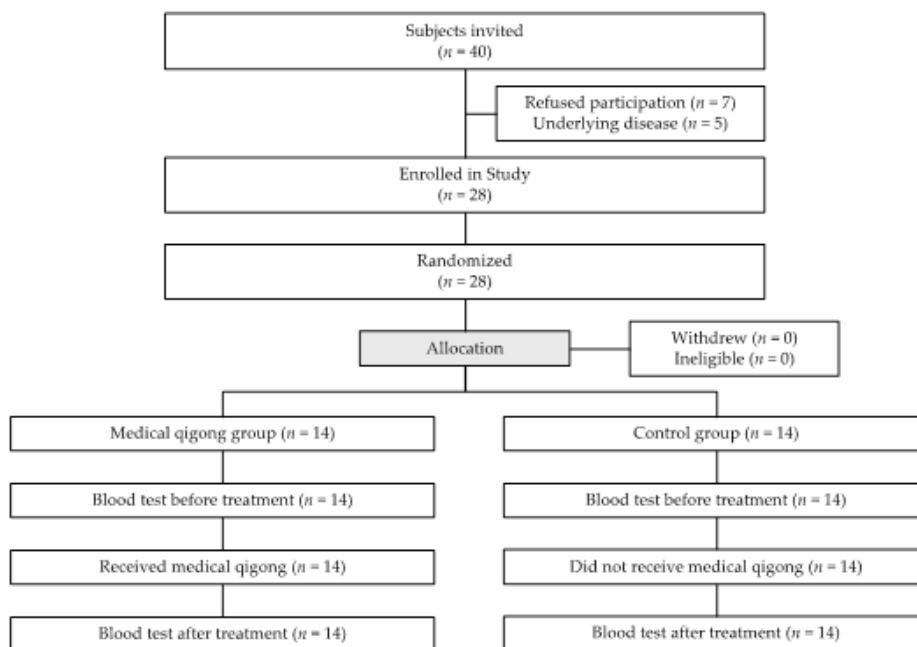
**Figure 1:** Our medical qigong protocols: (a) medical interview; (b) gently touching four acupuncture points (Hyakue, Indo, Mizoochi and Tanden); (c) transmitting qigong energy emitted from the practitioner’s hands to the subject’s brainstem and frontal lobe; (d) transmitting qigong energy to the seated subject around the Ninmyaku; and (e) transmitting qigong energy into the subject’s governor vessel meridian (Tokumyaku).

In this study, we defined “medical qigong” as qigong that involves medical interviews and tests to determine its effectiveness under a doctor’s supervision at a medical facility. One of oriental medicine’s important concepts is “Qiketsu”, commonly known as qi and blood flow in the body. The path through which Qiketsu flows is called the meridian, and this is where acupuncture and moxibustion are performed. There are approximately 360 acupuncture points over the human body on meridians that open to the body surface [11]. Our medical qigong transmits qi to acupuncture points on these meridians without using invasive stimulation, such as acupuncture needles. Applying this energy to each organ through the body’s meridians brings about changes in the mind and body. The primary outcome was the change in plasma cortisol in blood tests before and after treatment. The secondary outcome was the change in adrenocorticotropic hormone (ACTH) before and after treatment. In addition, white blood cell (WBC), red blood cell (RBC), hemoglobin (Hb), hematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), platelets and C-reactive protein (CRP) were also examined to

evaluate each subject’s condition and confirm reproducibility. Considering the circadian rhythm of plasma cortisol, pre-treatment blood tests were performed from 10:00 to 10:15 am, and post-treatment blood tests were performed from 11:30 to 11:45 am. No data were excluded from any analyses except for an apparent outlier, which could affect the unbiased comparison. Categorical data were summarized as the frequency (%), and continuous data were expressed as the mean and standard deviation (SD). Group comparisons between medical qigong and control groups were performed using Fisher’s exact test for categorical variables and the Mann–Whitney U test for continuous variables. All statistical analyses were performed using Mathematica software version 13.0 (Wolfram Research, Champaign, IL, USA). A value of  $p < 0.05$  was considered significant.

## Results

Of 40 invited subjects, 28 were enrolled, and 14 were randomly assigned to each of the medical qigong group and the control group. All enrolled subjects completed the protocol; there were no dropouts (Figure 2).



**Figure 2:** CONSORT flow chart showing the subjects' flow through this trial.

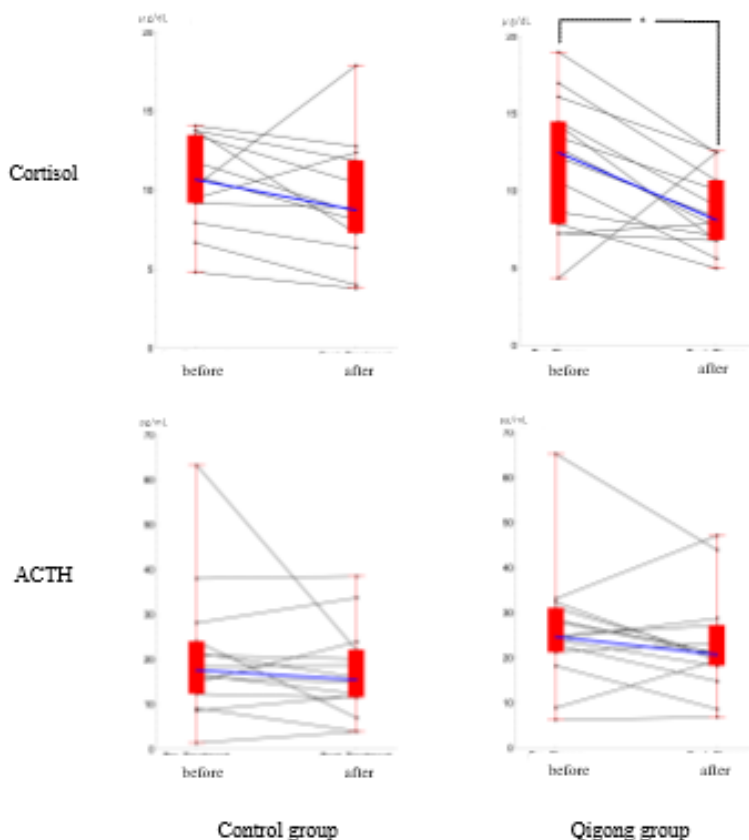
There were no significant differences in sex, age, WBC, RBC, Hb, HCT, MCV, MCH, MCHC, platelets, CRP, ACTH or cortisol between groups, as illustrated in Table 2.

Variable	Total	Control Group	Qigong Group
No. of patients (n)	28	14	14
Mail (n,%)	7 (25)	4 (28.6)	3 (21.4)
Age (years)	49.2 ± 6.7	47.8 ± 7.4	50.6 ± 5.9
Plasma cortisol (µg/dL)	12.1 ± 5.8	12.3 ± 7.1	11.8 ± 4.3
ACTH (pg/mL)	23.7 ± 14.4	21.0 ± 15.1	26.4 ± 13.7
WBC (/µL)	5557 ± 1974	5614 ± 1983	5500 ± 2039
RBC (×10,000/µL)	457.0 ± 44.1	454.5 ± 45.9	459.5 ± 43.7
Hb (g/dL)	14.0 ± 1.2	14.0 ± 1.2	14.0 ± 1.2
HCT (%)	43.5 ± 3.6	43.4 ± 3.6	43.6 ± 3.6
MCV (fL)	95.4 ± 3.8	95.8 ± 4.1	95.0 ± 3.6
MCH (pg)	30.7 ± 1.4	30.8 ± 1.4	30.6 ± 1.7
MCHC (%)	32.2 ± 0.8	32.2 ± 0.7	32.2 ± 0.9
Platelet (×10,000/µL)	24.9 ± 5.0	25.0 ± 5.4	24.8 ± 4.7
CRP (mg/dL)	0.07 ± 0.18	0.11 ± 0.25	0.025 ± 0.02

Data are expressed as the mean ± standard deviation. ACTH: adrenocorticotrophic hormone; WBC: white blood cell; RBC: red blood cell; Hb: hemoglobin; HCT: hematocrit; MCV: mean corpuscular volume; MCH: mean corpuscular hemoglobin; MCHC: mean corpuscular hemoglobin concentration; CRP: C-reactive protein.

**Table 2:** Characteristics and comparison between the study groups.

The medical qigong group’s plasma cortisol was  $11.8 \pm 4.3 \mu\text{g/dL}$  before treatment and  $8.8 \pm 2.5 \mu\text{g/dL}$  after treatment, showing a significant difference ( $p = 0.039$ ). In contrast, the control group’s plasma cortisol was  $12.3 \pm 7.1 \mu\text{g/dL}$  before treatment and  $10.8 \pm 6.6 \mu\text{g/dL}$  after treatment, with no significant difference ( $p = 0.1$ ). There was no significant difference in the amount of change in ACTH between the medical qigong group and the control group (Figure 3).



**Figure 3:** Changes in plasma cortisol and ACTH in qigong and control groups. \*  $p < 0.05$ .

There were no significant differences in the amount of change in WBC, RBC, Hb, HCT, MCV, MCH, MCHC, platelets or CRP between groups (Table 3). No adverse events occurred during the study.

Variable	Control Group	Qigong Group
	After treatment	After treatment
Plasma cortisol ( $\mu\text{g/dL}$ )	$10.8 \pm 6.6$	$8.8 \pm 2.5^*$
ACTH (pg/mL)	$17.1 \pm 10.2$	$22.9 \pm 11.3$
WBC ( $/\mu\text{L}$ )	$5729 \pm 2097$	$5693 \pm 2173$
RBC ( $\times 10,000/\mu\text{L}$ )	$455.3 \pm 45.3$	$449.2 \pm 45.0$
Hb (g/dL)	$16.0 \pm 8.0$	$13.7 \pm 1.2$
HCT (%)	$43.5 \pm 3.5$	$42.3 \pm 3.6$
MCV (fL)	$95.7 \pm 4.0$	$94.4 \pm 3.5$
MCH (pg)	$30.6 \pm 1.3$	$30.4 \pm 1.3$

MCHC (%)	32.0 ± 0.8	32.2 ± 0.7
Platelet (×10,000/μL)	23.5 ± 6.3	23.6 ± 4.7
CRP (mg/dL)	0.021 ± 0.02	0.023 ± 0.02

Data are expressed as the mean ± standard deviation, \*p<0.05 ACTH: adrenocorticotrophic hormone; WBC: white blood cell; RBC: red blood cell; Hb: hemoglobin; HCT: hematocrit; MCV: mean corpuscular volume; MCH: mean corpuscular hemoglobin; MCHC: mean corpuscular hemoglobin concentration; CRP: C-reactive protein.

**Table 3:** Comparison of changes before and after treatment.

## Discussion

To the best of our knowledge, there are no prospective randomized controlled trials evaluating the effects of medical qigong on stress in healthy individuals. This study showed that our original medical qigong session (approximately 40 min) significantly decreased plasma cortisol in healthy subjects. Plasma cortisol is influenced by circadian rhythms and indicates cortisol status minutes to hours earlier. Therefore, it was selected as the stress marker when examining the relationship between physical and mental state fluctuations in the short term [12]. In this study, the medical qigong group outperformed the control group in diurnal fluctuations; a significant decrease in plasma cortisol was observed, suggesting the possibility that medical qigong reduces stress in healthy people in the short term. Qigong is a traditional wellness technique from ancient China; based on the concept of qi, qigong developed as a technique to regulate internal energy flow [13]. In Qigong, meridians and acupuncture points play important roles in traditional medical systems, such as acupuncture and moxibustion therapy. In ancient Chinese medicine, meridians are thought to be pathways for vital energy and substances. Meridians run throughout the body and are associated with organs and tissues. Worldwide, 361 acupuncture points are recognized, located at key points on the meridians; it is reported that various symptoms can be alleviated by applying stimulation, such as acupressure, acupuncture and moxibustion, to these acupuncture points. There are also left and right pairs of acupuncture points, and approximately 700 acupuncture points throughout the body [11]. In modern times, qigong has been scientifically verified and integrated into the medical system. It is also accepted, researched and practiced in different cultures and regions, including Japan. In particular, qigong has played an important role in the field of stress management [14]. Regarding mental health, including anxiety and depression, other studies have emphasized the use of meditation therapies, such as mindfulness, which lowered these parameters in cancer patients [7]. It was previously found that an eight-week qigong program reduced anxiety and depression in breast cancer survivors [8]. It has also been reported to improve psychological well-being and balance the autonomic nervous system in patients with non-Hodgkin's lymphoma [9]. In Japan, there are several

reports that qigong promotes a decrease in cortisol. Higuchi reported that plasma cortisol and adrenaline levels both declined during zazen, concluding that zazen alleviated stress; sympathetic nerve activity also declined [15]. Changes in the endocrine system differed, depending on the qigong method and the practitioner; it has been reported that cortisol and adrenaline decreased when certain conditions were met [16]. However, there is little scientific evidence regarding medical qigong's clinical effects, and much remains unexplained. Additionally, some scientists think qigong is illogical and questionable. In fact, some qigong practitioners are unreliable, which hinders the development of medical qigong. Our study was a scientific evaluation of medical qigong's short-term effects on plasma cortisol, and presents evidence of medical qigong's effectiveness. There are some limitations in this study. It used a small sample size and short observation period; a large-scale, long-term study is required. However, many biases in daily life increase stress; this short-term test was designed so that such biases would not affect the results.

## Conclusions

Our medical qigong significantly reduced plasma cortisol in healthy subjects in the short term. These results suggest that medical qigong can relieve modern people's stress.

**Acknowledgment:** We are grateful to all the participants who willingly took part in the study.

**Ethics Considerations:** The study was conducted according to the Declaration of Helsinki guidelines, and was approved by the local research ethics committee (IRB number: 21001).

**Conflict of interest:** The authors declare that they have no conflicts of interest.

**Consent for publication:** Informed consent was obtained from all subjects involved in the study.

**Funding:** This research received no external funding.

**Data Availability Statement:** The data are available upon reasonable request from the corresponding author.



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