

# Effectiveness of Qigong exercises and resilience training on the perceived stress of male students due to COVID-19

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## SUMMARY

### Background

According to experts, stress causes a weak immune system and makes people vulnerable to the coronavirus. Accordingly, the aim of this study was to compare the effectiveness of Qigong exercises and resilience training on the perceived stress of male students due to COVID-19.

### Methods

A semi-experimental design was conducted (pre-test and post-test) with two experimental and one control groups. 45 male students of Tabriz university who had higher scores on the Cohen Perceived Stress Scale (PSS-14) were selected by convenience sampling and randomly divided into two experimental groups (15 participants in each group) and one control group (15 participants). For the first group, resilience training (10 sessions; a week 2 sessions, one and a half hours) and for the second group, Qigong exercises (10 sessions; a week 2 sessions, 30 minutes) was applied and the control group did not receive any training. Prior and after the training, the subjects completed Cohen et al. (1983) Perceived Stress Scale (PSS-14). Univariate analysis of covariance (ANCOVA) was used to analyze the data.

### Results

The results showed that the mean scores of Perceived Stress due to COVID-19 reduced significantly in the resilience training group compared to the Qigong exercises group and in the Qigong exercises group compared to the control group in the post-test ( $p < 0.05$ ).

### Conclusions

The results showed that resilience training is more effective in reducing perceived stress among male students due to COVID-19 disease than Qigong exercises.

**Key words:** resilience, Qigong, perceived stress, COVID-19, male students

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## Introduction

COVID-19 disease, caused by SARS-CoV-2, was first diagnosed in December 2019 in Wuhan, China<sup>1</sup>. The outbreak spread from Wuhan city to 30 provinces in China and then to other countries. As now, cases of this disease have been reported in all countries of the world<sup>2</sup>. Symptoms of COVID-19 in patients including fever (98%), cough (76%), fatigue and muscle aches (44%) and shortness of breath (55%)<sup>3</sup> in a small number of patients diarrhea (3%), vomiting (5%), sputum (28%) and bleeding (5%) have been reported<sup>4</sup>.

The existence of patients with coronavirus in Iran was officially confirmed on February 20, 2020<sup>5</sup>. Public health efforts to curb the rapid transmission of COVID-19 have led to infection control measures and changes in related procedures and policies. Governments have implemented a wide range of containment measures, including early detection and quarantine

of suspected and confirmed cases, establishment of shelter hospitals, travel restrictions, issuance of diagnostic kits and extensive quarantines, and a social and physical distancing plan <sup>6</sup>.

But the implementation of health policies, despite the positive consequences, has led to negative psychological effects in society. Fear of illness, fear of death, spreading false news and rumors, interfering with daily activities, travel prohibitions or restrictions, reducing social relationships (co-workers, friends and family), job and financial problems, and dozens of other consequences. These conditions threaten the mental health of participants in society <sup>7</sup>. In fact, the unknownness of the disease and the creation of cognitive ambiguity in individuals, lack of definitive treatment, high prevalence and high mortality have caused severe psychological maladaptation such as stress, anxiety and depression <sup>8</sup>. Perceived stress is the body's response to a change that requires adaptation or a physical or mental response. Stress can be caused by any stressful factor or stimulus, even dealing with a patient <sup>9</sup>. Fear and stress by stimulating the hypothalamus in the brain and subsequently increasing the secretion of cortisol from the adrenal cortex and stimulating the sympathetic nerves throughout the body in the short term is beneficial for the body to deal with stressors <sup>10</sup>. However, if this fear and stress and the body's response to increase cortisol levels and sympathetic stimulation persists in the long run, it is destructive and leads to a weakened immune system and reduced ability of the body to fight diseases such as coronary artery disease <sup>11</sup>.

University students are another group of person prone to developing psychological symptoms during the outbreak of COVID-19 disease. At the beginning of the outbreak of this disease in our dear country Iran, like other countries in the world, the closure of universities was one of the first and most basic measures to prevent the widespread spread of COVID-19 disease <sup>12</sup>. Son et al. <sup>13</sup> in an interview survey to examine the effects of COVID-19 on the mental health of university students on 195 students at a large public university in the United States and found that out of 195 students, 138 (71%) showed increased stress and anxiety due to the prevalence of COVID-19.

Numerous stressors were found to help increase students' levels of stress, anxiety, and depressive thoughts, including fear and anxiety about their own and their loved ones' health (91% reported negative effects of the epidemic), difficulty concentrating (89%), Disorders in sleep pattern (86%), decreased interactions due to the plan of physical and social distance (86%) and increased concerns about academic performance (82%). To cope with stress and anxiety, participants sought support from others and helped themselves by adopting negative or positive coping mechanisms.

Today, students have an important role in governing the future of the country. The importance of this role is that students are not only the main part of specialists in various fields of each country, but also this group are the main managers in the future administration of the country and the leader of other sections of society in leading to the perfection and goals of the country. A society that thinks about its own health and that of its future generations should take steps to achieve its ideals more than before by examining and eliminating the causes of stress and causing mental health problems or maintaining the health of its future creators <sup>14</sup>. Researchers believe that resilience training <sup>15</sup> and Qigong exercises <sup>16</sup> are among the interventions that can play a significant role in reducing stress.

Resilience as a process is the ability to successfully adapt to threatening conditions and in other words, positive adaptation in response to adverse conditions <sup>17</sup>. Of course, resilience is not just passive resistance to harm or threatening situations, but the resilient person is an active participant and builder of his or her environment. Resilient participants with the ability to return and recover, have optimism and intellectual flexibility, skilled in transforming problems as an opportunity to learn and grow, have perseverance, self-esteem, have a healthy support network, able to develop emotional and supernatural abilities, have voice independence, They have a sense of humor and have the ability to solve problems and resolve conflicts <sup>18</sup>.

While participants with low resilience are vulnerable and lack the courage, motivation and strategies to change stressful situations, they exaggerate their problems and consider themselves victims of accidents <sup>19</sup>. Accordingly, resilience is a trait that varies from person to person and can increase or decrease over time <sup>20</sup>.

Although resilience is to some extent a personal trait and to some extent the result of one's environmental experiences, humans are not victims of their environment or inheritance; individuals can be trained to increase their resilience capacity by learning certain skills. Individuals' reactions to stress can be altered by unpleasant events and difficulties, so that they can overcome negative environmental problems <sup>21</sup>. Resilience skills training refer to a cognitive-behavioral process that provides a variety of alternative and potential responses to problematic situations and increases the possibility of selecting the best and most effective alternative responses <sup>22</sup>.

Rose et al. <sup>23</sup> showed that the subjects had significantly less stress and more perception of stress after the implementation of the program "Resilience and stress management".

In recent years, participants have increasingly used mind and body exercises (such as Qigong, Tai chi and

Yoga) as complementary and alternative therapies to control stress<sup>24</sup>. The 2012 US National Health Interview (NHIS) data show that more than 7 million adults in the United States practice taichi and Qigong (TQ), and its popularity is growing worldwide<sup>25</sup>. Qigong is an ancient martial art developed in China that has been used in China for thousands of years to improve fitness and endurance. The basic components of Qigong practice include concentration, relaxation, meditation, breathing regulation, posture, and movement<sup>26</sup>.

According to the philosophy of traditional Chinese medicine, Qigong practice is the concentration of the senses and gentle movements to achieve a coordinated flow of vital energy (qi) and to regulate the body's functional activities through regulated breathing. By exercising regularly and practicing structural movements, as well as focusing on the mind and breath, practitioners can experience mood stabilization and improved strength and fitness. Qigong is a body-fitting exercise that is easily flexible and can be practiced anywhere, anytime, without any special equipment. This method is widely used not only to improve physical health, but also to control stress and improve psychological well-being<sup>27</sup>. According to the theories of amines and endorphins, an increase in parasympathetic levels and a decrease in sympathetic activity are associated with a decrease in blood pressure and levels of stress hormones (eg, noradrenaline, cortisol, etc.), which leads to a decrease in anxiety and stress after short-term Qigong training<sup>28</sup>. The results of a study by Feng et al. (2008) show that, like other mind and body exercises in traditional Chinese medicine, Qigong regulates the rhythm and pattern of breathing, movement and posture, and meditation. Due to these characteristics, Qigong has a remarkable ability to prevent, treat and rehabilitate respiratory infections such as COVID-19. Potential mechanisms of action include reducing stress, regulating emotions, strengthening respiratory muscles, reducing inflammation, and strengthening immune function<sup>29</sup>.

The results of systematic study and meta-analysis of Wang et al.<sup>8</sup> showed that Qigong had a positive effect on psychological well-being and reduced depression and anxiety.

Considering that the student community of our country constitutes a significant part of the population and is increasing every year, the importance of students' health (physical and mental) is becoming much clear. Due to the research gap and the lack of empirical research in the field of educational interventions affecting the perceived stress caused by coronavirus in students and the lack of any therapeutic comparisons in this field, this study aims to compare the effect of resilience training and Qigong exercises on perceived stress.

## Materials and methods

The method of the present study was quasi-experimental (pre-test-post-test) using two experimental groups and one control group. The statistical population of the present study is all male students of University of Tabriz in the academic year 2020-2021 in the number of 13,000. The sample of the study, 45 male students was selected using available sampling method and randomly in two groups. Qigong resilience training and exercises (15 participants in each group) and a control group (15 participants) are placed.

The criteria for entering the group were: 1: age range 25 to 40 years; 2: has higher scores on the Cohen Perceived Stress Scale (PSS-14)<sup>33</sup>; 3: absence of physical disability; 4: do not use psychiatric drugs; 5: conscious and voluntary satisfaction of participating in meetings and criteria for exclusion from the present study: 1: not attending meetings for more than one session; 2: the occurrence of a specific problem during the study was considered. It should be noted that every 45 male students who meet the inclusion criteria according to their place of residence to health centers in Tabriz who have a file and based on the diagnosis of internal medicine (blood test) of coronary heart disease and its symptoms, including disorders respiratory, runny nose, dry cough, dizziness, sore throat and body aches, no fever. After receiving the license from the University of Tabriz, coordination with the authorities and obtaining informed consent from the male students, it was decided that the selected students (it should be noted that first the perceived stress scale of Cohen et al.<sup>33</sup> was designed online on the University website. All male students of University were provided with a questionnaire and some of them (about 800 participants, students who met the inclusion criteria; were invited to the university by phone) at the appointed time in the amphitheater, the theater of the University of Tabriz which had the necessary facilities including proper ventilation, computer, video projector, etc., to attend.

After the presence of 45 male students (performing a thermometer at the entrance of the university to check participants's body temperature was used as a screener and the use of health alcohol to disinfect hands and provide a mask to each subject and observe social distance as a health protocol in this study. The researcher communicated with the participants, answered the students' questions, and explained how to complete the questionnaires.

After conducting the pre-test (Cohen et al. Perceived Stress Scale, 1983)<sup>33</sup>, an agreement was reached on the date of the next sessions and 45 male students who met the inclusion criteria were randomly divided into 2 experimental groups of 15 (group 1: resilience training and group 2: Qigong exercises) and 15 control group were divided. After selecting the test groups, in the introduc-

tory session of the experimental groups, they were given a summary of the goals and methods of resilience training and Qigong exercises, and they were asked not to talk about the content of the sessions with other students and also asked confident students. They were not under any other educational or medical program.

Experimental group 1 students received resilience training (10 sessions; two sessions in a week in one hour) and experimental group 2 students received Qigong training exercises (10 sessions of 30 to 40 minutes per week) and the control group did not receive any training at all. In resilience training sessions, training materials were presented in power point format along with pictures and Qigong exercises were performed outdoors in a football field (on a soft mat for each subject) in accordance with the health protocol.

After the training sessions, post-test (Cohen et al. Perceived Stress Scale, 1983)<sup>33</sup> was measured in all three groups (2 experimental groups and one control group).

#### The following tools have been used to collect information

##### *Cohen Perceived Stress Scale (PSS-14)*

The Perceived Stress Questionnaire was first developed by Cohen et al.<sup>33</sup> This tool is very suitable for determining the extent to which participants recognize their stress in the face of unpredictable and uncontrollable events in life and contains 14 questions and the answers are arranged in a scale of five Likert options. For each option, a score of 0 to 4 is awarded (0 = never, 1 = rarely, 2 = sometimes, 3 = most of the time, and 4 = all the time). For 8 tool questions, the scores are calculated inversely. The range of scores that can be achieved is between 0.56 and higher scores indicate more perceived stress. The overall score of perceived stress is divided into three levels (0-14, 15-28, 58-29). Cronbach's alpha coefficients ranged from 0.84 to 0.86 in students<sup>33</sup>. In Iran, in the study of Shamsi et al.<sup>34</sup>, Cronbach's alpha level was reported to be 0.88. Also, the validity of this questionnaire has been confirmed by factor, structural and content analysis methods<sup>34</sup>.

#### Intervention methods

##### *Resilience training*

For the first group, resilience training was taught in 9 sessions and each session for one and a half hours in groups. This treatment method has been developed by Jahed Motlagh et al. (2015) and its effectiveness on anxiety and stress has been confirmed<sup>24</sup>.

##### *Qigong exercises*

The total duration of the exercises was 10 sessions, two sessions per week and each session lasted 30 to 40 minutes. Traditional Chinese Qigong is all about the coordination of body, breath and mind through a series of movements and

has been shown to have mental benefits (reducing anxiety and stress) and physical health [lowering blood pressure, better sleep, increasing endurance, improving kidney function]. Is the relief of low back pain)<sup>25</sup>. These Qigong exercises are part of the Qigong movements that affect mental happiness, health, and stress reduction, adapted from Yang's book Health and Martial Arts, and can be seen in Figure 1 (left to right, respectively).

#### Data analysis

Data were analyzed using SPSS-21 statistical software. Univariate analysis of covariance test with assumptions of normal distribution of scores through Shapiro-Wilk test, assumption of homogeneity of regression slope using group interaction\* Pre-test and Levin test for homogeneity of variable variance error in groups were used.

#### Results

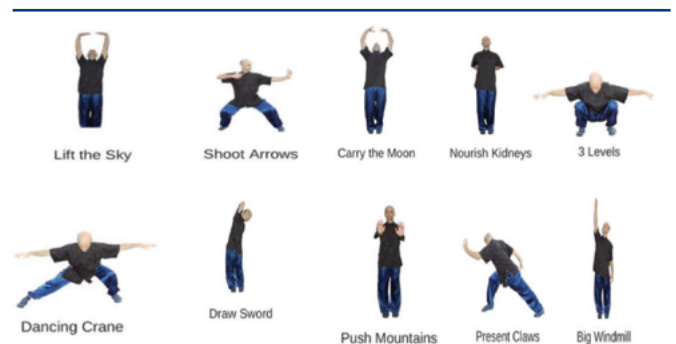
According to the Table I, it is concluded that resilience training have a significant positive effect on reducing the perceived stress of students due to corona.

According to the Table II, it is concluded that Qigong exercises have a significant positive effect on reducing the perceived stress level of students due to corona.

According to the Table III, it is concluded that the effect of resilience training on reducing the perceived stress of students due to corona is significantly greater than the effect of Qigong exercises.

#### Discussion

The aim of this study was to compare the effect of resilience training and Qigong exercises on the perceived stress caused by COVID-19. Compared to the Qigong training group and in the Qigong training group compared to the control group, it decreased significantly in the post-test. There is no report in the research literature on comparing the effectiveness of these trainings on reducing perceived stress due to COVID-19 in male



**FIGURE 1.** Qigong movements performed in the training protocol.

**TABLE I.** Results of differences between perceived stress in post-test of control and resilience training groups.

Source of change	Sum of squares	df	Average squares	F	P	Eta
The effect of pre-test	452.02	1	452.02	1580.1	0.001	0.976
Group effect	415.12	1	415.12	1412.4	0.001	0.768
Error	7.424	27	0.285			
Total	5641	30				

**TABLE II.** Results of differences of perceived stress in the post-test between control and Qigong exercises groups.

Source of change	Sum of squares	df	Average squares	F	P	Eta
The effect of pre-test	552.02	1	552.02	1465.1	0.001	0.980
Group effect	115.12	1	115.12	356.4	0.001	0.754
Error	9.424	27	0.345			
Total	5232	30				

**TABLE III.** Results of differences of perceived stress in the post-test between resilience training and Qigong exercises groups.

Source of change	Sum of squares	df	Average squares	F	P	Eta
The effect of pre-test	467.15	1	467.15	2365.1	0.001	0.978
Group effect	79.12	1	79.12	446.4	0.001	0.654
Error	5.32	27	0.176			
Total	6246	30				

students; But the results are consistent with the results of studies by Steensma et al.<sup>23</sup>, and Rose et al.<sup>25</sup> that group resilience training has led to the use of effective coping strategies and also plays an important role in reducing stress, increasing adaptation and control perception. Students have been stressed.

Also with the results of studies by Wang et al.<sup>8</sup> and Feng et al.<sup>31</sup> that Qigong exercises have a significant ability to prevent, treat and rehabilitate respiratory infections such as COVID-19 as well as has a positive effect on physical-mental well-being and reduces adult stress, anxiety and depression.

Explaining this research finding, it can be stated that the release of COVID-19 due to its rapid transmission, which is a feature of this virus, has caused a state of emergency in global health in less than a few months around the world. This contagious disease not only raises concerns about public physical health but also causes a number of psychological illnesses. In these circumstances, maintaining the mental health of individuals is essential, as participants in different parts of society may experience stressful stimuli during the release of COVID-19<sup>12</sup>. The physiological effects of stress are beneficial when there

is a response to prepare the body for "war and escape," but they can be harmful if prolonged.

In short, the experience of stress for a long time can weaken the human immune system and make a person vulnerable to diseases, from small samples such as colds to more serious cases such as COVID-19<sup>40</sup>.

But the important thing about stress is how you respond to it, which can play a big role in a person's adjustment. Resilience is defined as a person's confidence in his or her ability to cope with stress, self-esteem, emotional stability, and personal characteristics that increase social support from others. Participants who are resilient often develop positive emotions. After dealing with stressors, they return to normal. Resilient participants go through stressful events without losing their mental health and suffering from mental illness. In some cases, they also seem to have progressed and succeeded despite their difficult experiences<sup>45</sup>.

Therefore, resilience training in this study causes students to be optimistic, assertive and confident in the face of stressful events such as COVID-19 disease. Optimistic students are more likely to use problem-solving coping techniques, and when problem-solving coping

techniques are not possible, they use emotion-based adaptive coping techniques such as acceptance, jokes, and positive situational reflection.

It also gives students positive feedback on students' efforts or progress through encouragement, gives them self-awareness, focuses on individual abilities and cognition, and makes students aware of their worth in general, and makes them aware of their inner abilities. Be aware of yourself to deal with problems and also increase responsibility in students by teaching meaning therapy in the final sessions of resilience, relying on the meaning, purpose and values of life as well as interacting with their peers. By accepting responsibility and accepting one's current situation, one is encouraged to work and strive to improve oneself and others in these coronary conditions, and to provide the basis for reducing stress.

On the other hand, one of the most important, simplest and least expensive therapeutic approaches is physical activity and exercise. With the widespread spread of the coronavirus (COVID-19) around the world, this concern has been raised about physical activity and exercise. Healthy and asymptomatic participants can continue moderate-intensity exercise and benefit from the resulting immune function by following health guidelines<sup>46</sup>. Qigong exercise is expected to be a complementary medicine method as a non-pharmacological, low-complication treatment that does not require special equipment; Along with other common therapies to reduce stress in these critical coronary conditions should be used.

The Qigong protocol includes tapping, stretching, massage, twisting and pressing on the spine, internal organs and muscle groups. These actions may increase the body's flexibility and physical health. In fact, evidence has shown that the unique spinal torsion and rotational movements in Chan Mi Gong (one of Qigong's major styles) are related to improved blood circulation<sup>34</sup>.

Cognitive-behavioral theory also shows that visual images help athletes regulate emotions, maintain focus under pressure, and increase pain tolerance, which is essential for optimal performance. Accordingly, Qigong causes the person to dismiss aimless thoughts and focus on current visual images (e.g., circulation). In addition, as the theory of distraction has suggested, cognitive activity can temporarily relieve participants of stress and everyday worries. To facilitate relaxation ("relaxation" in "emotion regulation"), qigong practitioners often use positive self-induction (e.g., relax), which was also used in our qigong program. Positive self-induction is likely to support and accelerate the healing process<sup>35</sup>. In fact, the basis of qigong's effect in reducing student stress probably involves several mechanisms. Exercise is known to reduce stress and a specific set of medical qigong is used. This study provides moderate intensity training<sup>43</sup>. Concentration meditation, a component of

qigong practice, also reduces stress<sup>44</sup>. The function of the slow and deep breathing pattern similar to that used in this qigong set in lowering blood pressure in participants with mild hypertension and normal blood pressure has been demonstrated through a mechanism related to reduced sympathetic activity<sup>45,46</sup>. Current evidence suggests that TQ training has a physiological effect on immune system function and inflammatory responses<sup>47</sup>. Finally, it has been reported that stress-related endogenous chemicals, including norepinephrine<sup>48</sup> and cortisol<sup>49</sup> are reduced by qigong.

Since previous studies have only examined the psychological consequences of coronavirus among individuals and the existence of a research gap in the field of psychological interventions in the field of mental health in university students has not been done. Therefore, in the present study, by examining the effect of Qigong exercises and resilience training, in fact, the physical and psychological dimensions of the effect on perceived stress caused by COVID-19 in students have been combined, which is the strength of this study. One of the limitations of the present study is that it is unisexual with limited participants. So, care should be taken in predicting the results in general.

## Conclusions

In general, it can be concluded that resilience training is more effective in reducing perceived stress caused by COVID-19 in male students than Qigong exercises. According to the results of this study and its confirmation through previous research, the use of a combined resilience training program along with Qigong exercises in accordance with the health protocol in person or in remote corona waves and using up-to-date facilities such as video conferencing. And the capacities of social networks and cyberspace are suggested by psychologists and sports educators as effective programs to reduce the perceived stress caused by coronary heart disease, especially students, should be considered by community health officials.

## Ethical consideration

This research has been conducted in compliance with ethical standards and participants' satisfaction.

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## Conflict of interest

The Authors declare no conflict of interest.

## Author contributions

All Authors had a common share.

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