

## Tracking Studies on the Effects of Qi Gong Fitness on Stress, Anxiety, and Depression Among Underprivileged Working Youth

### ABSTRACT

**Objective:** This study aimed to evaluate the effectiveness of Qi Gong fitness in alleviating stress, anxiety, and depression among underprivileged working youth with a follow-up study.

**Methods:** Eighty subjects were randomly assigned to normal groups (NG) and treatment groups (TG), with 40 participants in each group. The Perceived Stress Scale (PSS), Generalized Anxiety Disorder 7 (GAD-7), and 24-Item Hamilton Rating Scale for Depression (HAMD-24) were used to evaluate the effect of Qi Gong fitness on alleviating stress, anxiety, and depression symptoms in underprivileged working youth.

**Results:** There was no significant difference in demographic outcome indicators between NG and TG. The main analytic results showed significant differences ( $P < .05$ ) in the intra- and inter-group comparisons of NG and TG in stress, anxiety, and depression before and after intervention. When compared with prior intervention, NG and TG after intervention showed more favorable scores in PSS, GAD-7, and HAMD-24, among which PSS (NG:  $51.61 \pm 4.32$  vs.  $29.80 \pm 3.08$ ; TG:  $55.21 \pm 5.41$  vs.  $15.85 \pm 2.25$ ;  $P < .01$ ), GAD-7 (NG:  $10.83 \pm 2.45$  vs.  $9.85 \pm 2.52$ ; TG:  $12.23 \pm 1.90$  vs.  $7.84 \pm 1.57$ ;  $P < .01$ ), and HAMD-24 (NG:  $10.83 \pm 2.45$  vs.  $9.85 \pm 2.52$ ; TG:  $25.63 \pm 3.94$  vs.  $11.40 \pm 3.82$ ;  $P < .01$ ); These results indicate that NG and TG have significant effects on alleviating occupational stress, anxiety, and depression in young underprivileged people.

**Conclusion:** The study indicates that Qi Gong fitness had a positive effect on reducing and alleviating stress, anxiety, and depression among young underprivileged professionals. This highlights the potential benefits of incorporating Qi Gong fitness into treatment plans.

**Keywords:** Qi Gong fitness, social underclass, professional youth, stress, anxiety, depression

### Introduction

Stress is a cognitive and behavioral experience process composed of both stressors and stress responses.<sup>1</sup> Under the “996” and “007” systems, such experiences have left contemporary youth in a state of long-term tension,<sup>2</sup> especially when facing unemployment, economic and housing pressures, along with a lack of income, which further exacerbates the psychological pressures on young people, even leading to suicidal intentions.<sup>3</sup> In Hong Kong and the Chinese mainland, about 56%-72.3% of people felt the increase of stress,<sup>4,5</sup> especially the effect of extreme personal behaviors caused by emotional collapse due to stress.<sup>6</sup> For young underprivileged people (referring to those with lower socio-economic status, difficult living conditions, and limited educational levels), this extreme behavior phenomenon is more significant.<sup>7</sup> A previous study has proposed that physical exercise effectively improves the psychological stress of young people by achieving stress release.<sup>8</sup> It found that intervention through physical exercise improves psychological stress levels by 50%-60%.<sup>9</sup>

For patients with anxiety and depression, regular participation in sports effectively prevents or alleviates mental illnesses, including anxiety and depression.<sup>10,11</sup> This may be due to sport



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being more social, thus possibly explaining why sports seem to have a special effect on anxiety and depression.<sup>12,13</sup>

Stress is one of the main factors leading to anxiety and depression.<sup>14</sup> In a survey of 645 young underprivileged people, it was found that stress was significantly positively correlated with anxiety and depression, with economic pressure found to be the main factor causing anxiety and depression among those studied,<sup>15</sup> while uncontrolled pressure has a serious impact on diseases related to physical and mental health, such as depression, fatigue, sleep disorder, diet problems, cardiovascular diseases, and even cancer.<sup>16,17</sup>

A recent study has found that among 239 respondents, increased activity of the amygdala due to emotional fluctuations caused by excessive stress was closely related to an increased risk of heart attack.<sup>8</sup> There was evidence to suggest that the best treatment for stress relief, anxiety, and depression was non-pharmacological therapy,<sup>16</sup> such as physical exercise, which was an effective means of promoting mental health, due to its stabilizing effects, high compliance, and fewer side effects,<sup>18</sup> especially for the release of stress in young people and improvement of depression and anxiety.<sup>19-21</sup> Previous studies have shown that Tai Chi or physical activity can be used as complementary and alternative therapy to manage psychological stress, anxiety, and depression.<sup>22-24</sup> Although they have confirmed that physical exercise effectively relieves psychological stress, alleviates anxiety and depression levels, there were still certain shortcomings to exercise therapy. In addressing this issue, this study adopts Qi Gong fitness as an intervention therapy for young underprivileged people. This was because Qi Gong fitness is a traditional health exercise that integrates focus, relaxation, meditation, breathing regulation, traditional Chinese medicine, and physical exercise to regulate physical and mental health. It had a history of thousands of years in China.<sup>18</sup> Importantly, the practice of Qi Gong fitness is not limited by weather or venue and there is no economic cost. This is an advantage that other sports do not have, such as basketball<sup>25</sup> and Tai Chi.<sup>22</sup> The purpose of this study was to evaluate the effectiveness of Qi Gong fitness in alleviating and improving stress, anxiety, and depression among working underprivileged youth through tracking interventions and obtaining effective evidence.

## Materials and Methods

### Participants

From September 1, 2023, to October 15, 2023, 210 participants were recruited. According to the inclusion and exclusion criteria and by

negotiation, 80 participants officially underwent clinical intervention and this follow-up survey. They all came from grassroots professional young workers in the capital city of Western China, including drivers, express delivery drivers, construction workers, waiters, and unemployed individuals.<sup>26-28</sup> The study was conducted from October 15 to December 15, 2023, a total of 65 days.

### Stress Perception Scale

The Perceived Stress Scale (PSS) refers to the degree to which an individual experiences stress on themselves after experiencing an event, resulting in psychological or physical responses. The PSS measures an individual's perceived stress, as well as their ability to handle stress and related coping characteristics. The scale has been translated into Chinese and validated. It adopts a 5-point scale grading method. Among them, questions 4, 5, 6, 7, 9, 10, and 13 are reverse questions. Its standard, "1," indicates the absence of perceived stress; "2" indicates negligible stress; "3" indicates some stress; "4" indicates frequent stress; "5" indicates always stressed. Scores of 14-28 indicate perceived low stress; 29-42, moderate stress; 43-56, high stress; and a score of 57-70 indicates very high perceived stress.<sup>29</sup>

### Generalized Anxiety Disorder 7

The Generalized Anxiety Disorder 7 (GAD-7) was a 7-item self-rated anxiety scale,<sup>26</sup> which has been verified and applied in Vietnam, Korea, Finland, and China.<sup>30-32</sup> Likert-4 rating scales were used for measurement, and the values were assigned from 0 to 3 in turn, from "none" to "almost every day." The GAD-7 score ranges from 0 to 21,  $\leq 4$  points indicates no anxiety, 5-9 points indicates mild anxiety, 10-13 points indicate moderate anxiety, and  $\geq 14$  points indicates severe anxiety. The Cronbach's  $\alpha$  value was 0.93.

### Hamilton Rating Scale for Depression

The Hamilton Rating Scale for Depression (HAM-D)-24 was used to measure the changes in depression scores among underprivileged youth before and after treatment.<sup>33-34</sup> It used a 5-level scoring method with scores of 0-4, the standard was "0" to indicate no depression; "1" indicates mild depression; "2" indicates moderate depression; "3" indicates severe depression; "4" indicates extremely severe depression. A total score of less than 7 is considered normal; A total score of 7-17 for depression indicates possible depression; A total score of 17-24 indicates depression; A total score greater than 24 points indicates severe depression.

### Tracking Intervention Measures

The normal group (NG) mainly adopts cognitive-behavioral therapy (CBT) when carrying out daily activities according to the requirements of psychological counselors. Psychological counselors provide daily health education and counseling on stress, anxiety, and depression of young working people through WeChat, reshaping their cognitive structure. Specific requirements and measures: First, sign in on WeChat groups before and after each learning session; Second, a total of 5 hours of online psychological counseling courses per week, with each course lasting 1 hour and a total of 45 class hours; Third, a total of 3 face-to-face interactions with 4 psychological counselors each week (Mondays, Wednesdays, and Fridays), totaling 27 times, to understand the psychological changes of the participants and an observer who takes notes. Fourth, all participants received a CBT manual and notebook, which provided a detailed introduction to the CBT outline. The notebook required weekly emotional states, thoughts, and perceived behaviors to be recorded.

## MAIN POINTS

- We aimed to evaluate whether Qi Gong fitness intervention can alleviate stress, anxiety, and depression among underprivileged young professionals.
- In this intervention follow-up study, 80 underprivileged working youth were included. A 65-day intervention using Qi Gong fitness significantly alleviated the pressure, anxiety, and depression of underprivileged working youth and reshaped their cognitive structure.
- Findings indicate that non-pharmacological treatment through Qi Gong fitness was both cost-effective and highly effective as a treatment for occupational stress, anxiety, and depression.

The treatment group (TG) received Qi Gong fitness intervention. Specific requirements and measures for the TG during the intervention period: First, 40 participants were divided into 4 groups, each consisting of 10 people, for a total of 4 groups. Each group consisted of 4 professors with over 15 years of teaching experience who explained the techniques and related theoretical knowledge of body movements, traditional Chinese medicine theory, health medicine, respiratory regulation, meditation and relaxation in Qi Gong fitness. Second, there were 5 Qi Gong fitness practice classes per week, each lasting 1 hour for a total of 9 weeks. The classes included 10 minutes of meditation practice, 40 minutes of traditional Chinese medicine knowledge, breathing regulation knowledge, Qi Gong fitness knowledge explanation and practice, 5 minutes of relaxation practice, 5 minutes of Q&A and homework assignments. Third, 4 psychological counselors tracked and communicated with subjects on a weekly basis to understand the difficulties encountered during the Qi Gong fitness intervention process and proposed outcome plans. This occurred 3 times each week (Mondays, Wednesdays, and Fridays), for a total of 27 times, and were recorded by an observer.

All participants were required to hold a summary meeting every Sunday to understand the overall change process of NG and TG.

### Statistical Analysis

All data collection was conducted in 2 stages, before and after intervention. All collected data were analyzed using IBM SPSS version 20.0 (IBM SPSS Corp.; Armonk, NY, USA) statistical software for baseline data, stress, anxiety, and depression levels in both NG and TG. Mean (SD) gave the central trend and degree of variation between the NG and TG before and after intervention; Maximum and minimum values were used to describe the range of changes between the NG and TG before and after intervention; A paired *t*-test was employed to compare the effects and changes of stress, anxiety, and depression between the NG and TG before and after intervention. All survey outcomes were analyzed at the levels of  $P < .05$  to evaluate significant differences between the NG and TG before and after intervention.

This study was reviewed and approved by the Ethics Committee of the Department of Physical Education of Xi'an Aeronautical University (approval number: XHPED20231015). All participants provided written informed consent.

## Results

### Sample Baseline Data

80 participants were randomly assigned to a NG ( $n=40$ ) and a treatment group (TG,  $n=40$ ) through EXCEL drawing. There was no statistically significant difference ( $P > .05$ ) between the 2 groups in terms of age, gender, or education level, which indicates that the 2 groups were balanced and comparable (see Table 1 for details).

### Stress Perception Assessment

According to the PSS survey results, there was no statistically significant difference between NG and TG before clinical intervention. After cognitive intervention and Qi Gong fitness intervention, there were significant differences in NG and TG both between and within groups ( $P < .05$ ). The mean within the NG decreased by 21.81, while the mean within the TG decreased by 39.36. After intervention, the mean difference between NG and TG was 13.95. This survey found that the intervention of Qi Gong fitness was more effective than cognitive

**Table 1.** Demographics and Clinical Characteristics of the Participants

Index	NG (n=40)	TG (n=40)	P	
Age (years)	20.50 ± 1.98	20.55 ± 1.44	.98	
Gender	Male	20.28 ± 2.02	20.38 ± 1.55	.78
	Female	20.68 ± 1.97	20.86 ± 1.23	
Education level	Primary school (N, %)	10, 25	9, 22.5	.85
	Middle school (N, %)	12, 30	11, 27.5	
	University (N, %)	18, 45	20, 50	

NG, normal group; TG, treatment group.

**Table 2.** Changes in Stress Perception Among Underprivileged Youth: Normal Group vs. Treatment Group

Index	Pre (M (SD))	Post (M (SD))	P <sup>1</sup>
NG (n=40)	51.61 (SD=4.32)	29.80 (SD=3.08)*	.00
TG (n=40)	55.21 (SD=5.41)	15.85 (SD=2.25)*	.00
P <sup>2</sup>	.693	.05	-

<sup>1</sup>P-value: between-group difference.

<sup>2</sup>P-value: within-group difference,  $P < .05$ , \* $P < .01$ .

SD, Standard Deviation.

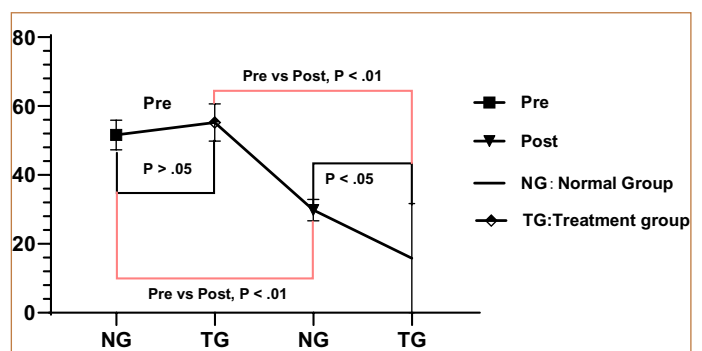
therapy intervention in relieving symptoms. According to Table 2 and Figure 1, the stress levels of underprivileged youth receiving Qi Gong fitness intervention are significantly lower than those of NG.

### Anxiety Level Assessment

First, there was no statistically significant difference in the total GAD-7 scores between NG and TG before intervention. After intervention, the total GAD-7 scores of NG and TG decreased with increased cognitive therapy intervention and Qi Gong fitness preservation intervention time ( $P < .05$ ). Among them, the intra-group mean of NG decreased by 0.98, the intra-group mean of TG decreased by 4.39, and the inter-group mean of NG was 2.01 higher than the TG mean. The 2 groups were significantly different ( $P < .05$ ), further indicating that the intervention effect on the TG was greater than that on the NG. Finally, survey results indicated that TG anxiety levels were significantly lower than NG ( $P < .05$ ). Please refer to Table 3 and Figure 2 for details.

### Depression Level Assessment

Table 4 and Figure 3 show there was no statistically significant difference in the total HAMD-24 scores between NG and TG before the intervention. The total HAMD-24 scores of NG and TG showed significant differences ( $P < .01$ ,  $P < .05$ ), with a ×5.65 decrease in the mean within the NG group and a ×14.23 decrease in the mean within the



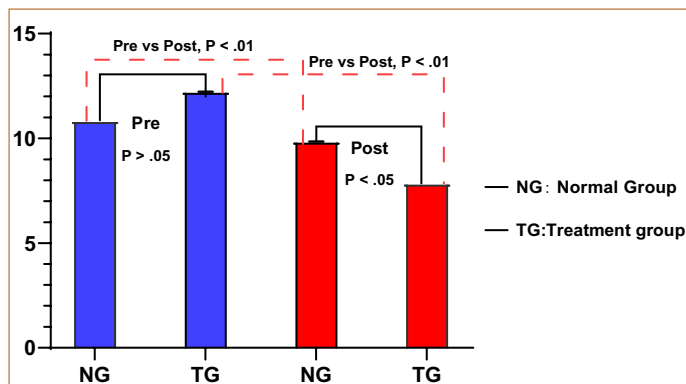
**Figure 1.** Perceived Stress Scale: normal group vs. treatment group.

**Table 3.** Changes in Anxiety Levels Among Underprivileged Youth: Normal Group vs. Treatment Group.

Index	Pre (M (SD))	Post (M (SD))	P <sup>1</sup>
NG (n = 40)	10.83 (SD = 2.45)	9.85 (SD = 2.52)*	.00
TG (n = 40)	12.23 (SD = 1.90)	7.84 (SD = 1.57)*	.00
P <sup>2</sup>	.168	.05	-

<sup>1</sup>P-value: between-group difference.

<sup>2</sup>P-value: within-group difference, P < .05, \*P < .01.



**Figure 2.** Generalized Anxiety Disorder 7: normal group vs. treatment group.

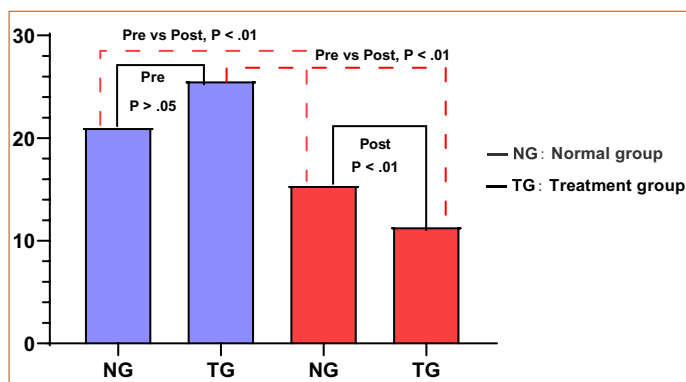
TG group. The mean between the NG group was ×4.03 higher than the mean within the TG group, and there was a statistical difference (P < .01) between the 2 groups, further indicating that the intervention effect of TG was greater than that of NG. Finally, survey results indicate that TG depression levels were significantly lower than NG (P < .01). Please refer to Table 4 and Figure 3 for details.

**Table 4.** Changes in Depression Levels Among Underprivileged Youth: Normal Group vs. Treatment Group.

Index	Pre (M (SD))	Post (M (SD))	P <sup>1</sup>
NG (n = 40)	21.08 (SD = 4.20)	15.43 (SD = 3.80)*	.00
TG (n = 40)	25.63 (SD = 3.94)	11.40 (SD = 3.82)*	.01
P <sup>2</sup>	.14	.01	-

<sup>1</sup>P-value: between-group difference.

<sup>2</sup>P-value: within-group difference, P < .05, \*P < .01.



**Figure 3.** Hamilton Rating Scale for Depression 24: normal group vs. treatment group.

## Discussion

This study aimed to evaluate the follow-up intervention effect of Qi Gong fitness on stress, anxiety, and depression in working underprivileged youth. It sought and explored non-pharmacological interventions to help alleviate the stress, anxiety, and depression of working underprivileged youth. Results of this study suggest that Qi Gong fitness intervention has a good moderating effect on stress, anxiety, and depression among working underprivileged youth and provides a new non-pharmacological treatment approach to alleviate and prevent mental illness.<sup>35</sup> Compared with CBT, underprivileged working youth have a more significant reduction in stress, anxiety, and depression levels after receiving clinical tracking interventions for Qi Gong fitness, which was both different and similar to research reported by relevant scholars.<sup>36</sup> The difference was that the current study suggests a close relationship between changes in stress, anxiety, depression, and physical activity, which is consistent with previous studies.<sup>37-38</sup> The similarity lies in the fact that physical activity can be regulated through physiological changes (decreased cortisol levels),<sup>36,38</sup> psychological changes (such as reduced anger and fatigue)<sup>38</sup> and social changes (such as providing opportunities for social support) to alleviate or prevent symptoms of stress, anxiety, and depression. The most important thing is that the “three keys” in Qi Gong fitness (i.e., adjusting body, adjusting breath, and adjusting psychology) are consistent with the “three factor theory of emotions” in modern psychology.<sup>41</sup> The 3 factor theory of emotions suggests that the generation of emotions is constrained by 3 conditions: environmental events (stimulating factors), physiological states (physiological factors), and cognitive processes (cognitive factors), among which cognitive factors are the key to determining the nature of emotions.<sup>41</sup> First, mind regulation refers to adjusting one’s thoughts (psychotherapy), reshaping cognitive structures, improving cognitive levels, in order to achieve psychological relaxation, help patients understand and process their emotions and thoughts, and thus alleviate and adjusting one’s body and breathing can help the body relax and breathe smoothly, thereby relaxing the body.<sup>42,43</sup> Second, breathing, as the only visceral physiological activity that can be regulated by humans,<sup>44</sup> respiratory regulation and structured body movements in Qi Gong fitness can lead to long and deep diaphragm movements and rhythmic, regular breathing, which in turn affects the autonomic nervous system and endocrine system, thereby restoring a person’s homeostasis through plasticity and regulate emotions and psychology.<sup>45,46</sup> Fourth, from the perspective of traditional Chinese medicine, Qi Gong fitness can achieve the effects of soothing the liver, regulating qi, and regulating emotions.<sup>47</sup> Furthermore, Qi Gong fitness can stimulate physiological factors, provide feedback to the brain (monoamine neurotransmitters in the brain, hypothalamic-pituitary adrenal axis and brain derived neurotrophic factors), and improve cognitive factors to explain the effects of Qi Gong fitness on stress, anxiety, and depression.<sup>48</sup> Therefore, compared to other sports, there are both similarities and differences. The similarity lies in the alignment between Qi Gong fitness’s body adjustment and other sports activities; The regulation of breath in Qi Gong fitness is consistent with Tai Chi<sup>49</sup> and yoga.<sup>24</sup> The difference lies in the heart regulating and traditional Chinese medicine treatment of Qi Gong fitness, which is an advantage that other sports do not have.

Evidence from a limited number of tracked clinical interventions suggests that the NG can significantly alleviate anxiety symptoms and



depression under cognitive-behavioral intervention and reshape cognitive structures to better interpret stress. The significant advantage of the TG was that Qi Gong fitness not only involves physical exercise but also integrates meditation, breathing regulation, and traditional Chinese medicine, which was incomparable to the NG. Study findings reported here indicate that the CBT of the NG is far from achieving the combined intervention treatment effect of the TG, which provides valuable references and insights for the treatment of stress, anxiety, and depression in young underprivileged people in today's society. Therefore, while acknowledging limitations, this study indicates that intervention treatment options in the TG have considerable potential, laying a promising direction for future research in this field. This study suggests that the first is to strengthen the attention of young underprivileged people. The second is that the prevention of cognitive problems among the underprivileged youth in society must take into account their economic income, life pressures, and practical issues. Third, more research is needed to explore non-pharmacological treatment options to alleviate stress, anxiety, and depression in the youth population.

**Data Availability:** The participants of this study did not agree to their data being shared publicly; therefore, supporting data are not available.

**Ethics Committee Approval:** This study was reviewed and approved by the Ethics Committee of the Department of Physical Education of Xi'an Aeronautical University (approval number: XHPED20231015).

**Informed Consent:** All participants signed an electronic version of the informed consent form.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – F.W., K.C.; Design – F.W., K.C.; Supervision – Y.C.; Resources – F.W., Y.C.; Materials – F.W., K.C., Y.C.; Data Collection and/or Processing – F.W., K.C., Y.C.; Analysis and/or Interpretation – F.W.; Literature Search – F.W.; Writing – F.W.; Critical Review – F.W., K.C., Y.C.

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**Declaration of Interests:** The authors have no conflict of interest to declare.

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