# Effectiveness of Tai Chi Exercise on Stress among Pediatric Nurses at Pediatric Intensive Care Unit

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**Abstract**

**Background:** The quality of care nurses provide can be significantly impacted by occupational stress, which can also negatively affect their quality of life. Tai Chi has three key components, including meditation, movement, and breathing. The set of relaxing, rhythmic, and fluid movements brings about a state of mental health and calm by fostering the body and mind as a coherent unit as well as evacuating the mind from thoughts that cause tension. **Hence, the current study aimed to** evaluate the effectiveness of Tai Chi exercises on stress among pediatric nurses at the pediatric intensive care unit**. Research design:** A quasi-experimental research design was used to fulfill this study using a pre-test and post-test one-group design. **Setting:** The study was carried out in the neonatal intensive care unit, at Sohag University Hospital, Egypt. **Subject:** A convenient sample that included (50) nurses was selected. **Tools of data collection:** Three tools were used; **Tool (I):** Personal data of the nurses and **Tool II:** Perceived Stress Scale-10 (PSS-10). **Results:** A statistically significant difference was found between stress mean scores at (P=0.001) pre and post-Tai Chi exercise intervention. Also, a substantial reduction in pre- and post-Tai Chi exercise intervention between the groups was reported regarding stress levels. **Conclusion:** The tai chi exercise intervention has resulted in a significant decrease in mean post-test stress scores among pediatric nurses. **Recommendations:** Provide a training program for pediatric nurses at the pediatric intensive care unit about the importance of the Tai Chi exercise intervention to be able to use them as a part of routine care.

**Keywords: Anxiety, Patients with Parkinson's disease, Stress, Tai Chi Exercise Application**

## Introduction:

A person's overall quality of life can be affected by their financial, emotional, and spiritual well-being; medical professionals have connected them to reduced stress and better mental and physical welfare; people have access to healthcare to maintain their health at this optimal level; and good health is essential for managing stress and living a longer, more active life. Health and mental health are perhaps the two types of health that are most frequently addressed (**Pavlos et al., 2019**).

Stress is a strain on the mind brought on by very demanding situations. Stress can originate from a variety of sources, including relationships, employment, family, and education. But keep in mind that the majority of our tension stems from how we perceive the situation rather than how it is. This impression is based on the psychology of judgment, which links our emotional states—rather than the stressor—to the events of the present. Stress is caused by feelings of jealousy or retaliation. Simply put, there is a discrepancy between what we expect and what occurs; the larger the discrepancy, the more stressed we are.

Occupational stress can have a detrimental effect on nurses' quality of life and raise the standard of care they deliver. Effective communication, the use of professional knowledge and abilities, close connections, skillful nursing, and interpersonal sensitivity all contribute to the interpersonal process of caring. Because it leads to a lack of empathy for patients and an increase in the frequency of practice errors, job-related stress has a negative correlation with the quality of care1.

The mental strain brought on by very difficult situations is known as stress. Any number of things, including relationships, work, family, and school, can cause stress. However, keep in mind that our perception of an event—rather than the actual event—is what causes the majority of our worry. This impression is based on the psychology of judgment, which I experience about the current situation, our emotional state, and not the stressor. Stress is brought on by feelings of jealousy or retaliation. The stress increases with the difference between our expectations and reality, to put it briefly (**Felfy et al., 2024).**

Tai Chi, also called Tai Chi Chuan, is a self-paced, non-competitive style of light physical activity and stretching that involves a series of movements performed slowly, intently, and in tandem with deep breathing. It is a graceful form of exercise that was once part of ancient Chinese culture. Each style has its own variations, and some may focus on maintaining good health, while others may emphasize the martial arts component. Like yoga, Tai Chi is a form of meditative movement (**Tang & Gu, 2022**).

Because stress is so common, experts from all over the world have dubbed it the "epidemic" or "illness" of the twenty-first century. They believe that specific life events, such as divorce, moving, losing a loved one, or losing a job, are the primary causes. In 2020, according to the American Institute of Stress, 33% of respondents said they were under a lot of stress. Of those surveyed, 77% said that stress had a bad impact on their physical health, 73% said that stress hurt their mental health, and 48% said that stress had made it difficult for them to sleep. 32.4% of nurses experienced depression, 41.2% expressed anxiety, and 41.2% indicated stress at work, according to another survey. 31% of Brazilian nurses, 33% of French nurse supervisors, and 35% of Chinese nurses said they had depressive symptoms. This variance in the prevalence of stress and its accompanying symptoms may result from the various organizational structures and management methods used by hospitals around the world **(Rica &Brinda, 2021).**

Ancient Chinese martial arts and folklore, breathing, and meditation techniques and traditional Chinese medical theory served as the foundation for the development of tai chi, which has its origins in historical turmoil (**Tang & Gu, 2022**). Similar to the scholarly concepts of traditional Chinese medicine, such as "use exercise to regulate emotions" and "the body and the spirit are jointly regulated," this kind of exercise therapy balances yin-yang and promotes equilibrium between the body and mind (**Pan et al., 2019**). It is loved by Chinese and also people from other Asian countries. A smart way to begin tai chi training is with group instruction, which may keep beginners interested and motivated to continue practicing. In particular, this is due to the social advantages of the communications and interactions regarding Tai Ch (**Gothe & Kendall, 2020**).

Originally conceived as a kind of self-defense, tai chi has evolved into a graceful form of exercise presently utilized to alleviate stress and various other health conditions. Tai Chi's fluid, flowing motions have been likened to meditation in motion. For nurses, Tai Chi is a creative, social, therapeutic, and recreational therapy that is one of the most beneficial interventions. To assess the impact of Tai Chi exercises on stress among staff nurses in a particular private hospital in Thanjavur, the researcher felt that this study was necessary (**De Micco et al., 2021**).

**Significant of the study:**

American Institute of Stress had estimated that in 2020, 33% of adults reported experiencing high stress. 77% of people reported that stress negatively had influenced their physical health, 73% reported that stress negatively had impacted their mental health, and 48% reported having sleeping difficulties as a result of stress. There are approximately 33.41 lakh registered nursing professionals in the nation, including 23,40,501 licensed practical nurses and licensed professional midwives, 10,080,05 nurse associates (9,43,951 auxiliary nurse midwives), and 56,854 lady health visitors. Chi is a creative, social, therapeutic, and recreational therapy that is one of the interventions that help nurses the most.

According to the 2020 National Nursing Workforce Survey, 75% of respondents said they had experienced stress, 62% said they had been frustrated, and 62% said they had been overwhelmed. According to the Indira Kranthi Patham (IKP) Center for Public Health Technology, 32.5% of staff nurses in Thanjavur have reported having stress-related health issues. Nonetheless, 65% of staff nurses report having stress-related health issues, while 15% of staff nurses gave neutral answers, 15% disagreed, and 5% strongly disagreed. Originally developed for self-defense, Tai Chi is now used as an elegant way to exercise to reduce stress and several other health issues. 1,000 individuals around the country (**Christianson, 2022).**

Tai chi was first created as a self-defense technique, but it has now evolved into a beautiful form of exercise that may be used to heal stress and other illnesses. The smooth, flowing motions of tai chi have led to comparisons to meditation in action (**Christianson, 2022**).

Three postures are also used in Tai Chi: low, medium, and high. Different Tai Chi styles have their own traits and call for varying degrees of physical stamina and flexibility from their practitioners. Additionally, it's critical to practice under the supervision of certified instructors and select a Tai Chi style that is appropriate for senior citizens with chronic illnesses or impairments. For example, lower positions require more balanced, flexible, and powerful motions.

**Aim of the study:**

**To** evaluate the effectiveness of Tai Chi exercise on stress among pediatric nurses in the pediatric intensive care unit.

**Research hypothesis:**

H1: Pediatric nurses who applied the Tai Chi exercise will experience lower mean scores of stress post-intervention than pre-intervention.

**Subjects and Method**:

**Research design:**

A quasi-experimental research design was used to fulfill this study using a pre-test and post-test one-group design.

**Setting:**

The study was carried out in the neonatal intensive care unit, at Sohag University Hospital, Egypt.

**Sample:**

A convenient sample that included (50) nurses

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Within six months a convenient sample included (50) nurses was selected from worked at the previously selected setting.

**Tool (I): Pediatric nurses Demographic data sheet:** Used to collect data regarding demographic data, it included 4 items related topersonal data such as age, educational level, occupation, residence, attending training courses regarding Tai Chi exercise, and their source of knowledge about Tai Chi exercise (De Micco et al., 2021& Christianson, 2022).

**Tool (II): Perceived Stress Scale-10 (PSS-10):**

The tool known as the Perceived Stress Scale-10 (PSS10) was adapted from **Cohen et al. (1983**). It is a ten-item self-report measure designed to assess an individual's degree of stress. The nurses are asked to rank their thoughts and feelings from the previous month. The nurses graded each item on a five-point scale that went from never (0) to very often (4). Consequently, the scores of each patient varied from 0 to 40. Higher reported stress levels were reflected by higher scores.

**Scoring system:**
Low levels of stress were indicated by PSS-10 scores between 0 and 13, moderate levels by scores between 14 and 26, and severe levels by scores of 27 or higher. Items 4, 5, 7, and 8 were the four that used reverse scoring. The PSS was correlated with measures of anxiety, sadness, helplessness, and disease activity to achieve convergent validity. There was 0.78 internal consistency on the scale.

**Tools validity and reliability**
The instruments were assessed for content validity, comprehensiveness, appropriateness, relevance, and clarity by five experts. Three pediatric nursing professors were among these specialists. The instruments' comprehensiveness, applicability, ease of use, and comprehension were also assessed. The judgment panel made no revisions to ensure that the sentences were clear and acceptable in terms of content. Statistical techniques were used to evaluate the internal consistency of instrument II, and the results indicated that the reliability was 0.923 according to Alpha Cronbach's approach.

**Pilot study**
To test the viability and applicability of the tools used in the current study for data collection, as well as to determine the time required to be applied, a pilot study was conducted on 10% (5 nurses) of cases after the tools were developed. No changes were made to the questionnaire, and the nurses who passed the pilot study were included in the main study sample.

**Ethical considerations:**
First approval was given in writing by the faculty dean and the faculty of nursing's research ethics committee. The researchers visited with the medical and nursing directors of the selected settings to gain their consent and to go over the purpose of the study. Prior to being permitted to participate, nurses were given written consent and told of the study's objectives. The researchers informed the nurses that participation in the study was voluntary and that they might withdraw from it at any time for any reason. Additionally, they were given guarantees that their information would remain private.

**Fieldwork:**
The researchers have visited the previously selected locations three days a week from 9 am to 1 pm. They gave nurses an introduction and described the study's objectives. Data was collected over the course of six months, from the beginning of November 2023 to the end of April 2024. It took thirty to forty minutes to finish each interview tool.

The researcher obtained the consent of the selected samples and gathered their demographic information before the examination. The pretest was conducted with stress measured using the Perceived Stress Scale.

**Implementation phase:**
A Tai-chi exercise was given to the staff nurses following the pretest. For twenty-one days, the researcher collected them and instructed them in Tai Chi exercises for twenty-five minutes. As she demonstrated the Tai-chi exercise, the researcher asked them to accompany her for the first seven days. The Tai Chi exercise sequence was repeated by the staff nurses from days eight through twenty-one while being supervised by the investigator. The researcher used the Perceived Stress Scale as part of a post-test to assess the effectiveness of the Tai Chi exercise.

**The intervention of Tai Chi exercises:**
Over two months, the intervention, which was specially created for nurses, involved three weekly one-hour group Tai Chi sessions. Two certified and experienced instructors will teach six pupils simplified Tai Chi routines after a series of conventional warm-up exercises. Swinging an arm, shifting weight, stretching the neck, shoulders, and spine gently, and visualization exercises were all part of the fifteen-minute warm-up. Whole-body breathing, or traditional breathing methods, were also covered. These exercises promoted general physical and mental relaxation, reduced physical tension, and enhanced breathing awareness. They also made it easier to incorporate action with pictures.

The 45-minute Tai Chi regimen consists of the following six primary movements: Rise and push down; (4) strike the monkey's ears with both fists; (5) push the monkey away; (6)

seize a sparrow's tail. (1) Move your hands in a cloud-like pattern.

A wild horse with a portion of its mane on either side. The exercises were selected because they are simple to learn and focus on walking bilaterally while shifting body weight, both of which can support nurses in maintaining postural stability. Nurses are free to unwind and proceed to the chairs that suit their comfort level.

**III: Evaluation phase:-**

This phase aimed to evaluate the effectiveness of Tai Chi exercise on stress among pediatric nurses at the pediatric intensive care unit post one month by giving a posttest to similar tools that were used in the pretest.

**Statistical analysis:**

For data entry and analysis, SPSS version 19 was utilized. To show the data, numbers, percentages, and mean standard deviations were employed. Using a chi-square test, the qualitative variables were compared. The mean standard deviation (SD) was used to report quantitative data that were normally distributed. The degree to which the demographic characteristics of the two groups were comparable was evaluated using either the Chi-Square test or the Fisher's exact test. Using the repeated measurements of analysis of variance (RM-ANOVA) test, differences in physiological parameters between the groups were sought. Statistical significance is defined as P-values below 0.05.

**Results**:

Of the nurses in the study, 60% were female and 42% were between the ages of 20 and 30, as shown in Table (1). The survey found that around 60% of the nurses who participated attended a nursing technical institute, based on their educational background. The same data also shows that half of the nurses in the research reported having five to ten years or less of experience.

**Figure 1** shows that every single nurse who took part in the study (100%) said they had not taken any Tai Chi exercise training classes.

**Table 2** demonstrates that the stress mean scores of the nurses under study were 33.22±4.42 on the pretest, as opposed to 12.22±3.45 on the actual test. A very statistically significant difference between the pre-and post-Tai Chi exercise intervention was found in the post-intervention.

According to **Figure 2**, the study nurses' stress levels significantly decreased after doing Tai Chi exercises, with 40% of them reporting severe stress levels compared to none at all after the test.

**Table 3** indicates that there was a correlation between the nurses' stress level and their education (P value<0.001). Furthermore, there was a correlation between the stress level of nurses and their years of experience (P value<0.001).

**Table (1): Personal data of the studied nurses (n=50)**

| Personal data | N | % |
|---|---|---|
| **Sex:** | | |
| Male | 20 | 40.0 |
| Female | 30 | 60.0 |
| **Age** | | |
| 20 > 30 | 21 | 42.0 |
| 30 > 40 | 16 | 38.0 |
| 40 > 50 | 7 | 14.0 |
| ≥50 | 3 | 6.0 |
| **Level of education** | | |
| Nursing diploma | 10 | 20.0 |
| Nursing technical institute | 30 | 60.0 |
| Health technical institute | 8 | 16.0 |
| Bachelor of Nursing | 2 | 4.0 |
| **Years of Experience** | | |
| 1 <5 | 15 | 30.0 |
| 5 <10 | 25 | 50.0 |
| ≥10 | 10 | 20.0 |

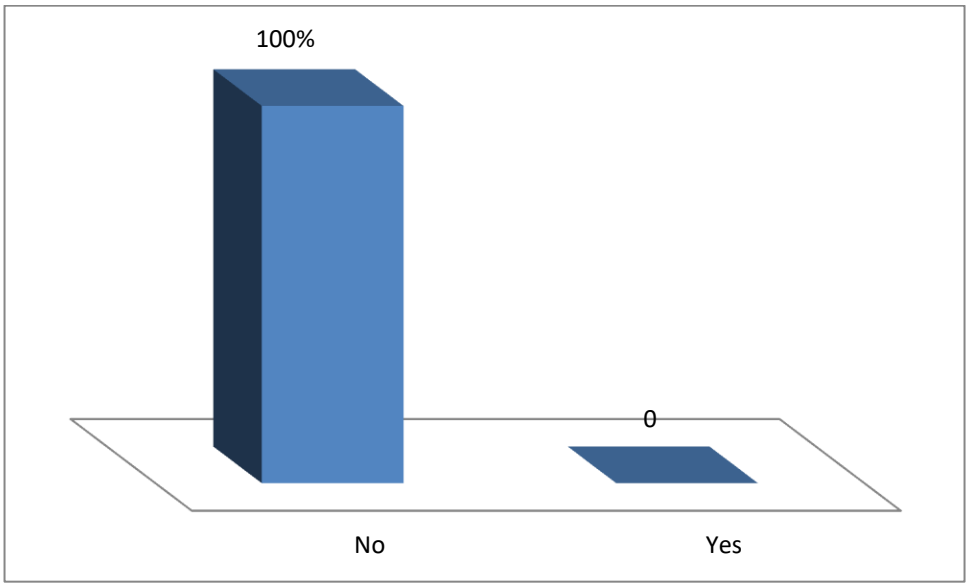


**Figure (1): Training course attendance concerning Tai Chi exercise among the studied nurses (n=50)**

**Table 2: Comparison between nurses' mean scores regarding the stress levels pre and post-Tai Chi exerciseintervention (n=50)**

| Items | Pre-test | Post-test | P –value |
|---|---|---|---|
| **Stress mean scores** | 33.22±4.42 | 12.22±3.45 | <0.001* |

*= significant at p<0.001 level.

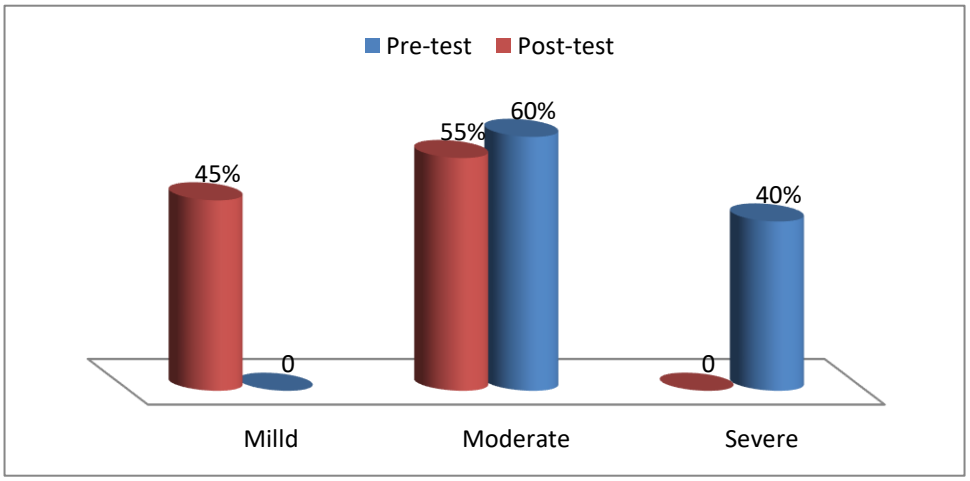


**Figure 2: Total stress levels of the studied nurse's pre and post-Tai Chi exercise** intervention **(n=50)**

**Table (3): Correlation between Total stress level and demographic data among the studied nurses (n= 50).**

| Items | | Future anxiety |
|---|---|---|
| **Nurses' age** | R | .186 |
| | P – value | .188 |
| **Nurses' sex** | R | -.042- |
| | P – value | .772 |
| **Nurses' Years of Experience** | R | **-.367** |
| | P – value | **.007**** |
| **Nurses' education** | R | **-.508** |
| | P – value | **.001**** |

**. Correlation is significant at the 0.01 level*

**Discussion:**

Tai Chi is a well-liked low-to-moderate-intensity aerobic exercise that is suitable for both young and elderly people. To maintain the harmony between the body and mind, **Lan et al. (2019**) state that it entails breathing, mental focus, physical balance, relaxed muscles, and deliberate integration. Headaches, vertigo, insomnia, and cerebral cortex-induced neurasthenia are all reported to be cured by tai chi. Blood viscosity, flexibility, and platelet function are all impacted by tai chi. So, the study was done to evaluate the effectiveness of Tai Chi exercise on stress among pediatric nurses at the pediatric intensive care unit.

Regarding the demographic data of the studied nurses, less than half of the nurses in the study were between the ages of 20 and 30 and three-fifths of them had degrees from nursing technical institutes, This result disagreed with **Mahdy et al., (2019)** findings, which indicated that 46.7% of nurses earned their nursing degrees from technical institutes.

The findings of the current study showed that all of the nurses who participated in the study reported didn't attend any training courses about Tai Chi exercise. This could be the reason for the lack of understanding of its significance.It demonstrated the urgent need for nurses for training courses in Tai Chi exercise.

The current study's findings showed that in the pretest, the stress mean scores among studied nurses was 33.22±4.42 compared to 12.22±3.45 In the post-intervention a highly statistically significant difference was detected between pre and post-Tai Chi exercise intervention. The researchers believed that this demonstrated the benefits of applying Tai Chi exercises, which aid in stress reduction.

This objective was supported by a study conducted by Rosario **et al., (2020**), who conducted a pre-experimental study on reducing stress using Tai chi exercises in selected nursing institutes in Pune city. The sample size was 60, and students were selected through a simple random sampling technique and split into two groups, 30 experimental and 30 control groups. The analysis shows a mean of 41.40 with a Standard Deviation of 16.76, a t value of 7.486 at $p< 0.05$ level. Thus the findings reveals that the stress decreased after intervention.

According to **Caroline & Edith J. (2019**), which supports this outcome. The research done by **Pavlos et al., (2019)** supports the results of this study. The study's conclusions showed that, during the pretest, the majority of nurses experienced moderate stress (53.3%), mild stress (40.0%), and severe stress (6.7%). After the test, the majority of nurses (73.3%) reported light stress and 26.7% reportedno stress. Furthermore, the outcomes of our research were consistent with earlier studies that discovered Tai Chi lessons considerably enhanced participants' subjective stress levels.

This finding was corroborated by astudy by **Steffen et al. (2020**), who investigated the effects of Tai Chi exercises on stress reduction and found that stress decreased following Tai Chi exercise application. This outcome was consistent with research done by **Yazhini et al., (2024**) which discovered that the Tai Chi exercise was useful in lowering stress levels in the sample under study.

The findings of the present study showed that there was a significant reduction in the level of stress among the studied nurses post-Tai Chi exercise application. From the researcher's point of view, it confirmed the success of the Tai Chi exercise application which meets the studied nurse's needs. The findings of the present study are supported by **Rica et al., (2021**) who found that Tai Chi exercise was effective in reducing stress.

Due to factors including inadequate training, low social recognition, high workloads, and poor organizational techniques, those in the healthcare industry are among the most susceptible to stress (**Ives & Sosnoff, 2020).** Untreated acute and chronic stress can result in persistent symptoms that may not respond to conventional therapy. People are therefore being pressured more and more to choose non-medical alternative pathways. The use of complementary and alternative medicines (CAMs) is a helpful strategy to lessen chronic pain caused bystress; the most popular CAMs are food supplements (39.1%), manual massages (23.1%), chiropractic adjustments (23.4%), tai chi, yoga, and meditation (20.5%), homeopathic remedies (12.8%), and acupuncture (4.7%) (**Wade et al., 2018**). The levels of perceived stress after the exercises were also significantly lower than those at the beginning while among the control group, all parameters remained unchanged (**Cheung et al., 2018**). From the researcher's point of view, it reflected the effectiveness of the Tai Chi exercise**application**

**Fransen et al., (2020)** found that Tai Chi did not have any positive effect on reducing stress. Furthermore, the current study's findings are consistent with those of **Zhao et al. (2021**), who discovered that Tai Chi training improved the physical and psychosocial impairment of people with limited physical mobility.

Exercise involving tai chi may have this effect because it reduces sympathetic nervous system activity. Researchers have proven that practicing Tai Chi can produce specific cell mediators, such as transforming growth factor-β and interleukin-10, by measuring salivary cortisol levels. The production of these mediators improves life quality and decreases psychological stress and anxiety (**Esch et al., 2020**). Moreover, Tai Chi training may increase participants' ability to control their feelings of stress, which would

improve patients' emotional states due to changes in the brain (**Huang et al., 2021**).

The results of the current study showed that after practicing Tai Chi, the examined nurses' level of anxiety significantly decreased. The present findings are consistent with those of **Saedeh et al. (2022**), who investigated the impact and outcomes of Tai Chi exercise. Additional research has looked into how Tai Chi can help with psychological symptoms like stress. Most of the research on this topic has looked at how Tai Chi benefits.

The current study that there was a Correlation between the nurses' education and their stress levels. Additionally, there was a Correlation between Nurses' years of Experience and their stress level. The findings of the present study are not supported by the following studies. **Harsha (2002**) conducted a study to assess the effectiveness of Taichi exercises on stress among college students at Bagalkot, Karnataka, to associate the knowledge with their demographic variables such as age, gender, religion, type of family, and previous school education. The researcher found that there was no association between stress and their selected demographic variables.

**Conclusion:**

Based on the study's findings and hypothesis, it was concluded that tai chi exercise intervention has a significant reduction in mean post-test stress scores among pediatric nurses.

**Recommendations**:

In light of the current study's findings, the following recommendations are made:

- Provide a training program for pediatric nurses at the pediatric intensive care unit about the importance of the Tai Chi exercise intervention to be able to use them as a part of routine care.
- Replication of this work with a larger sample size is required to allow for generalization.

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