

Effectiveness of Tai Chi Exercise Application on Nurses' Stress and Anxiety Caring of Patients with Bone Marrow Transplantation

¹Mona Mohamed Ibrahim Abdelal, ²Manal Mohamed Ahmed Ayed, ³Asmaa Anise Hassan Abdelaal, ⁴Heba Kedees Marzouk, ⁵Elhaga Ibrahim Eldesouky Mohamed

1 Assistance Professor at Medical-Surgical Nursing, Faculty of Nursing, Beni-Suef University

2 Assistant Professor of Pediatric Nursing, Faculty of Nursing, Sohag University, Egypt

3 Lecturer at Medical-Surgical Nursing, Faculty of Nursing, Sohag University

4 Assistant Professor of Psychiatric Mental Health Nursing Faculty of Nursing Assiut University

5 Assistant Professor of Medical-Surgical Nursing Department, Faculty of Nursing, Port Said University

Abstract

Background: Bone marrow transplant units are stressful work environments with high staff burnout, anxiety, and turnover. Nursing care of blood and marrow transplantation patients is complicated. Studies directly compare the clinical efficacy of different Tai Chi exercises in treating anxiety and stress symptoms despite the growing body of evidence supporting the beneficial effects of Tai Chi in reducing these symptoms. **Therefore, the current study aimed to** determine the effectiveness of Tai Chi exercise application on nurses' stress and anxiety when caring for patients with bone marrow transplantation. **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 conducted at an Oncology institution affiliated to Sohag University, Egypt. **Subject:** A convenient sample that included (50) nurses was selected by using a Nonprobability Purposive sampling technique. **Tools of data collection:** Three tools were used; **Tool (I):** Personal data of the nurses, **Tool II:** Perceived Stress Scale-10 (PSS-10), and **Tool III:** The State-Trait Anxiety Inventory. **Results:** A statistically significant difference was found between stress mean scores and anxiety at ($P=0.001$) pre and post-Tai Chi exercise application. Also, a substantial reduction in pre- and post-Tai Chi exercise application between the groups was reported regarding stress and anxiety levels. **Conclusion:** The application of tai chi has resulted in a significant decrease in mean post-test stress and anxiety among nurses caring for patients with bone marrow transplantation. **Recommendations:** Provide a training program for nurses caring for patients with bone marrow transplantation about the importance of the Tai Chi exercise application to be able to use them as a part of routine care with patients.

Keywords: Anxiety, Patients with Bone Marrow Transplantation, Stress, Tai Chi Exercise Application

Introduction:

Bone marrow transplantation (BMT) is currently a life-saving treatment for several severe disorders. BMT has shown rapid growth and continuous technological improvement over the previous 20 years (Daikeler and Hirano, 2019). Multipotent hematopoietic stem cells are transplanted during hematopoietic stem cell transplantation, which is commonly carried out using bone marrow, peripheral blood, or umbilical cord blood (Felfy et al., 2024).

Adults' red bone marrow produces all of their platelets, all red blood cells, and around 60–70% of their lymphocytes. There are two types of bone marrow: red and white. Red bone marrow, the liver, the spleen, and other lymphocytes—including those that develop in the red bone marrow and end up in the lymphatic tissues including the thymus, spleen, and lymph nodes—all play a role in the body's process of getting rid of old red blood cells (Bishop & Keating 2019).

The other variety is yellow bone marrow, which

serves as a fat storage area. It contributes to sustaining the appropriate conditions for the bone to operate. The yellow marrow may, however, become damaged under some circumstances, such as significant blood loss or fever, the yellow marrow may revert to red marrow, and yellow marrow tends to be located in the central cavities of long bones and is generally surrounded by a layer of red marrow with long trabeculae within a sponge-like reticular framework (Guohua, 2019).

Good physical health can work in tandem with mental health to improve a person's overall quality of life. People have access to healthcare to keep their health at this optimal level. Good health is crucial for managing stress and leading a longer, more active life. Physical and mental health are perhaps the two types of health that are most commonly addressed. General health is impacted by one's financial, emotional, and spiritual well-being. Medical experts have linked them to less stress and improved mental and physical welfare (Pavlos et al., 2019).

Stress is a mental strain caused by extremely demanding circumstances. Stress can come from anywhere; any time may be from work, family, school, relationships, etc. But remember most of our stress comes from the perception of an event, not the way the event is. This perception depends on the psychology of judgment my experience is connecting to the present event, our emotional state not the stressor. Jealousy or revenge on a person causes stress. In short, it is a gap between our expectations and reality, the more the gap more the stress (Felfy et al., 2024).

Occupational stress has a severe impact on nurses' quality of life and can dramatically affect the quality of care they deliver. The interpersonal process of caring is characterized by close connections, skilled nursing, interpersonal sensitivity, efficient communication, and the application of professional knowledge and abilities. Because it causes a decrease in patient empathy and an increase in the frequency of practice errors, job-related stress is negatively connected with the quality of care provided (Pavlos et al., 2019).

Bone marrow transplantation nurses must be knowledgeable about treatment adverse effects, including those related to steroids, including renal failure, infectious problems, microvascular damage, and steroid myopathy. It is necessary to take into account endocrine consultations, physical therapy, occupational therapy, and diabetic education. Coping with changes in body image and the stress of therapy might be facilitated by seeking professional counseling and psychosocial assistance. A few of the stressors mentioned are exhaustion, altered cognitive function, sleep disturbance, anxiety, depression, posttraumatic growth (where some patients report a renewed sense of purpose in life), and sexual dysfunction (Yazhini et al., 2019).

Tai Chi is a graceful type of exercise that was formerly a part of ancient Chinese culture. It entails a series of movements carried out slowly, intently, and in tandem with deep breathing. Tai Chi, also known as Tai Chi Chuan, is a self-paced, non-competitive technique of light physical activity and stretching. Your body was in constant motion since each posture led seamlessly into the next. Tai Chi offers a wide range of styles. Every style may gently highlight different tai chi ideas and techniques. Every style has its variations. Some Tai Chi styles could concentrate on maintaining good health, while others might concentrate on the martial arts component. Similar to yoga, Tai-chi is a form of meditative movement (Tang & Gu, 2022).

Stress is a common response to daily stresses, but it can turn unhealthy when it interferes with your daily activities. Stress is a very important part of life that

affects how people develop from childhood to maturity. Some forms of stress can lead to antisocial behavior and a loss of self-worth.

Stress is so pervasive that experts from all over the world have termed it the "epidemic" or "illness" of the 21st century, with particular life events like divorce, relocation, losing a loved one, or losing a job being thought to be the main causes. American Institute of Stress had estimated that in 2020, 33% of adults reported experiencing high stress. 77% of people reported that stress negatively 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. Another study found that 32.4% of nurses had depression, 41.2% had anxiety, and 41.2% reported work-related stress. 35% of Chinese nurses, 51% of Brazilian nurses, and 33% of French nurse supervisors reported having 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).

One study found that 87.6% of nurses were stressed out, with 2.1% of them reporting severe stress. 52% of nurses in a different study who reported feeling stressed out had severe stress. When asked if they had an extremely stressful, upsetting, or traumatic experience nearly half (42 percent) of nurse respondents said "yes" (Judith et al., 2020).

Tai Chi has its roots in ancient China and developed historically via historical upheaval, guided by the principles of Chinese martial arts and folklore, breathing and meditation techniques, and traditional Chinese medical theory (Tang & Gu, 2022). This type of exercise treatment harmonizes yin-yang and fosters homeostasis between body and mind, much like the academic ideas of traditional Chinese medicine, which include "use exercise to regulate emotions" and "the body and the spirit are jointly regulated" (Pan et al., 2019). Chinese people and even those from other Asian countries adore it. Group instruction is a good way to start tai chi training since it may keep students engaged and inspired to keep practicing. This is especially because of the social benefits yielded by the communications and interactions regarding Tai Chi (Gothe & Kendall, 2020).

Tai Chi is a graceful type of exercise that was formerly a part of ancient Chinese culture. It entails a series of movements carried out slowly, intently, and in tandem with deep breathing. Tai Chi, also known as Tai Chi Chuan, is a self-paced, non-competitive technique of light physical activity and stretching. Your body was in constant motion since each posture led seamlessly into the next. Tai Chi offers a wide range of styles. Every style

may gently highlight different tai chi ideas and techniques. Every style has its variations. Some Tai Chi styles could concentrate on maintaining good health, while others might concentrate on the martial arts component. Similar to yoga, Tai-chi is a form of meditative movement (De Micco et al., 2021).

Significant of the study:

Tai chi was originally developed as a means of self-defense, but it has now developed into a graceful kind of exercise that can be used to treat a variety of ailments, including stress. Tai Chi is sometimes compared to meditation in action because of its fluid, flowing movements (Christianson, 2022).

In addition, Tai Chi has three postures: low, medium, and high. Each Tai Chi style has its characteristics and requires practitioners to have different levels of flexibility and physical endurance. It is also crucial to practice under the guidance of qualified instructors and to choose a Tai Chi style that is suitable for elderly individuals with disabilities or long-term diseases. For instance, stronger, more flexible, and balanced movements are required in lower positions. Beginners are therefore recommended to start with higher postures in Tai Chi and work their way down to lower ones (Carey, 2021).

Still, there is inconsistent practice, and that's precisely because there are many different Tai Chi forms, each with its frequency, duration, and target audience. Nevertheless, the results of various Tai Chi practice techniques will vary as well. As a result, there is still debate on the best therapy for Parkinson's disease patients, and there is no clear solution for selecting an exercise regimen that works for these people (De Micco et al., 2021).

The National Nursing Workforce Survey, 2020 reported that they had felt stressed (75 percent), frustrated (65 percent), and overwhelmed (62 percent). Indira Kranthi Patham (IKP) Center for Public Health Technology reported that, In Thanjavur, 32.5% of staff nurses have health problems related to stress, and 32.5% of staff nurses have said as much. However, 65% of staff nurses have health problems related to stress, compared to 15% of staff nurses who reported neutral responses, 15% of respondents who disagree, and 5% of staff nurses who have health problems who strongly disagree.

Although it was originally established for self-defense, TaiChi is now employed as a graceful form of exercise to alleviate stress and various other health conditions. Tai Chi is sometimes described as meditation in motion because of its fluid, flowing motions. Tai Chi is a creative,

social, therapeutic, and recreational therapy that is one of the interventions that help nurses the most. Accordingly, the researcher thought that this investigation was necessary to determine how beneficial Tai Chi activities are.

Aim of the study:

To determine the effectiveness of Tai Chi exercise application on nurses' stress and anxiety caring for patients with bone marrow transplantation.

Research hypothesis:

H1: Nurses who received the Tai Chi exercise will experience lower mean scores of stress post-application than pre-application.

H2: Nurses who received the Tai Chi exercise will experience lower mean scores of anxiety post-application than pre-application.

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 conducted at an Oncology institution affiliated with Sohag University, Egypt.

Sample:

A convenient sample that included (50) nurses was selected by using a Non-non-probability Purposive sampling technique that worked at the previously selected setting within six months.

Tools of data collection:

Tool (I): Personal data sheet: Used to collect data regarding personal data, it included 4 items related to personal data such as age, educational level, occupation, residence, attending training courses regarding Tai Chi exercise, and their source of knowledge about Tai Chi exercise.

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.

Tool (III): The State-Trait Anxiety Inventory:

The State-Trait Anxiety Inventory is a 40-item self-assessment questionnaire made up of brief statements that were designed by **Spielberger in 1972** to determine the trait and state anxiety level. The scale has 20 items for assessing trait anxiety and 20 for state anxiety. **State anxiety items** involve: "I am tense; I am worried" and "I feel calm; I feel secure." **Trait anxiety items** involve: "I worry too much over something that doesn't matter" and "I am content; I am a steady person." All items are rated on a 4-point scale.

Scoring system:

The scale items measure the level of State-Trait Anxiety and are scored as follows: "none" (1), "some" (2), "many" (3), and "entirely" (4). The highest score obtained is 80 and the lowest score is 20. Low scores indicate a mild form of anxiety and high scores indicate a severe form of anxiety.

Tools validity and reliability

Five experts evaluated the instruments for content validity, clarity, comprehensiveness, appropriateness, and relevance. These experts included two professors in the field of psychiatric nursing and three professors in the field of medical-surgical nursing. They also evaluated the instruments for ease of use, comprehension, applicability, and comprehensiveness. To guarantee sentence clarity and content appropriateness, no changes were made by the panel verdict. The stability of the internal consistency of instrument II was assessed using statistical methods, and the results showed that the reliability was 0.923 using Alpha Cronbach's method. State-Trait Anxiety with a Cronbach's alpha of 0.87 for the overall score, inventory reliability is regarded as good.

Pilot study

After developing the tools, a pilot study was conducted on 10% (5 nurses) of cases to test the feasibility and applicability of the tools used in the current study for data collection as well as to determine the time required to be applied and no modifications were done of the questionnaire and the nurses who were tested in the pilot study were included in the main study sample.

Ethical considerations:

The faculty dean and research ethics committee of the faculty of nursing provided written initial approval. To acquire their agreement and to explain the goal of the study, the researchers visited with the medical and nursing directors of the chosen settings. Nurses were informed of the study's purpose and allowed to provide written consent before being allowed to participate. The nurses were told by the researchers that the study was optional, they could choose not to join, and they could leave the study at any moment, for any reason. They also received assurances of the confidentiality of their information.

Fieldwork:

Three days a week, from 9 am to 12 pm, the researchers have visited the previously chosen sites. They introduced themselves to nurses and explained the purpose of the study. From the start of October 2023 to the end of March 2024, a period of six months was used to gather data. Every interview tool took between thirty-five to forty-five minutes to complete.

Before the investigation, the investigator acquired the consent of the chosen samples and collected their demographic data. Using the Perceived Stress Scale to gauge stress and the State-Trait Anxiety Inventory to gauge anxiety, the investigator administered the pretest.

Implementation phase:

The staff nurses were given a Tai-chi exercise after the pretest. For 21 days, the investigator gathered them and gave them a 25-minute Tai Chi exercise lesson. The investigator requested them to follow along with her for the first seven days while she showed the Tai-chi exercise. Under the investigator's supervision, the staff nurses repeated the Tai Chi exercise sequence from days eight through twenty-one. The efficiency of the Tai Chi practice was evaluated by the investigator using a posttest that included anxiety and the Perceived Stress Scale.

The intervention of Tai Chi exercises:

Specifically designed for nurses, the intervention consisted of three weekly one-hour group Tai Chi sessions that ran for two months. Following a series of traditional warm-up exercises, six students will be instructed in simplified Tai Chi routines by two qualified and experienced instructors. Warm-up exercises for fifteen minutes included swinging an arm, shifting weight, gentle neck, shoulder, and spine stretching, and visualization exercises. Traditional breathing techniques, or whole-body breathing, were also included. These exercises improved breathing awareness, lowered physical tension, and encouraged overall body and mental relaxation. They also improved the integration of imagery into action.

The following six main movements comprise the 45-minute Tai Chi routine: Get up and push down; (4) smack both fists on the ears; (5) push the monkey away; and (6) grab a sparrow's tail. (1) Move your hands in a manner reminiscent of clouds.



A section of the mane on both sides of a wild horse. The chosen movements were chosen for their ease of understanding and emphasis on bilateral walking while transferring body weight, which can help nurses maintain postural stability. Nurses can relax and move on to the chairs that are provided according to their comfort level.

III: Evaluation phase:-

This phase aimed to determine the effectiveness of Tai Chi exercise application on nurses' stress and anxiety caring for patients with bone marrow transplantation. This was done by giving a posttest similar tools to the pretest post one month.

Statistical analysis:

The SPSS version (19) was used for both data entry and analysis. Numbers, percentages, and mean standard deviations were used to display the data. The qualitative variables were compared using a chi-square test. Quantitative data were reported as mean standard deviation (SD) if they were normally distributed. Either the Fisher's exact test or the Chi-Square test was used to assess how comparable the demographic attributes of the two groups were. To look for variations in physiological parameters across the groups, the repeated measurements of analysis of variance (RM-ANOVA) test was used. P-Values less than 0.05 are regarded as statistically significant.

Results:

According to **Table (1)**, 46% of the nurses in the study were between the ages of 20 and 30, and 70% of the nurses were female. A nursing technical institute was attended by around (54%) of the nurses who took part in the study, according to their educational level. Additionally, as the same figure demonstrates, forty percent of the study's nurses stated they had five to 10 years' experience or less.

Figure (1): Illustrates that (86%) of the studied nurses who participated in the study reported didn't attend any training courses about Tai Chi exercise.

Figure (2): Shows that 64% of the studied nurses stated that the main source of knowledge about Tai Chi exercise was doctors.

Table 2 shows that in the pretest, the mean and standard deviation of the level of stress among studied nurses was 31.78 ± 4.55 . In the post-application, the mean and standard deviation of the level of stress among studied nurses was 12.33 ± 2.23 with a highly statistically significant difference found pre and post-Tai Chi exercise application among studied nurses.

Figure 3 predicts that there was a significant reduction in the level of stress among the studied nurses post-Tai Chi exercise application where (76%) of them had a mild level of stress, (24%) had a moderate stress level, and no one of them had severe stress.

Table 3 shows that anxiety mean scores were lower post-application in comparison to their anxiety mean scores pre-application, with a statistically significant difference among the studied nurses pre and post-Tai Chi exercise application ($p < 0.001$).

Figure 4 predicts that there was a significant reduction in the level of anxiety among the studied nurses post-Tai Chi exercise application. In the pre-Tai Chi exercise application, anxiety level was a high level of anxiety among (44%) of the studied nurses compared to no one who had (0%) a high anxiety level post-Tai Chi exercise application.

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

Personal data	N	%
Sex:		
Male	15	30.0
Female	35	70.0
Age		
20 > 30	23	46.0
30 > 40	20	40.0
40 > 50	5	10.0
≥50	2	4.0
Level of education		
Nursing diploma	12	24.0
Nursing technical institute	27	54.0
Health technical institute	8	16.0
Bachelor of Nursing	3	6.0
Years of Experience		
1 <5	16	32.0
5 <10	20	40.0
≥10	14	28.0

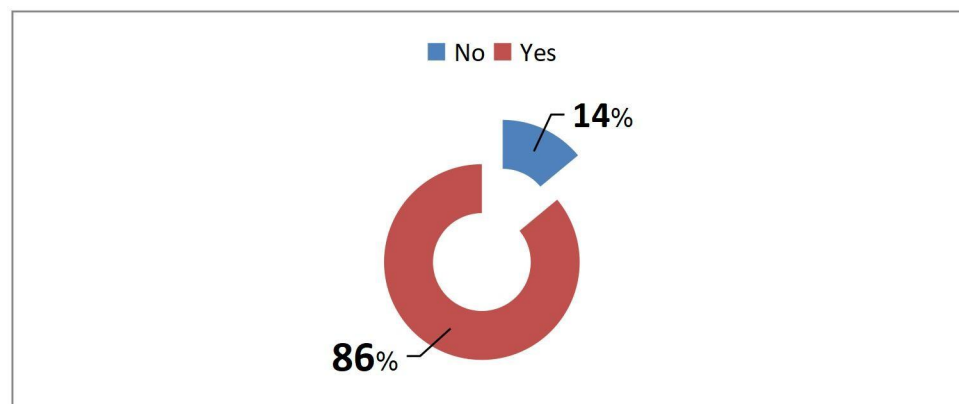
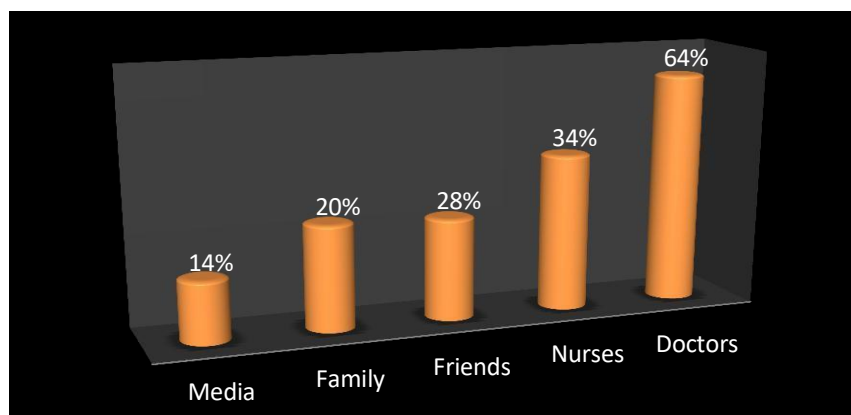
**Figure (1): Attending Training courses about Tai Chi exercise among the studied nurses (n=50)****Figure (2): Source of knowledge about Tai Chi exercise among the studied nurses (n=50)**

Table 2: Mean scores differences of the stress levels among the studied nurses pre and post-Tai Chi exercise application (n=50)

Items	Pre-application	Post application	P –value
Stress mean scores	31.78±4.55	12.33±2.23	<0.001*

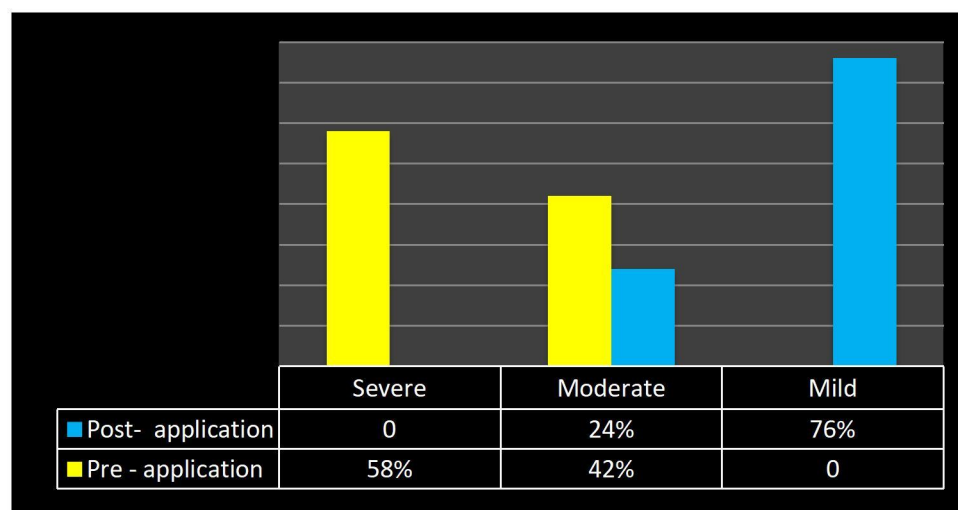


Figure 3: Total stress levels among the studied nurses pre and post-Tai Chi exercise application (n=50)

Table 3: Comparison between the studied nurses regarding anxiety means scores pre and post-Tai Chi exercise application (n=50)

Items	Pre-application	Post- application	t-test	p-value
Anxiety Scale Scores	37.33 ± 8.55	23.22 ± 2.44	14.34	<0.001*

*= significant at $p < 0.001$ level.

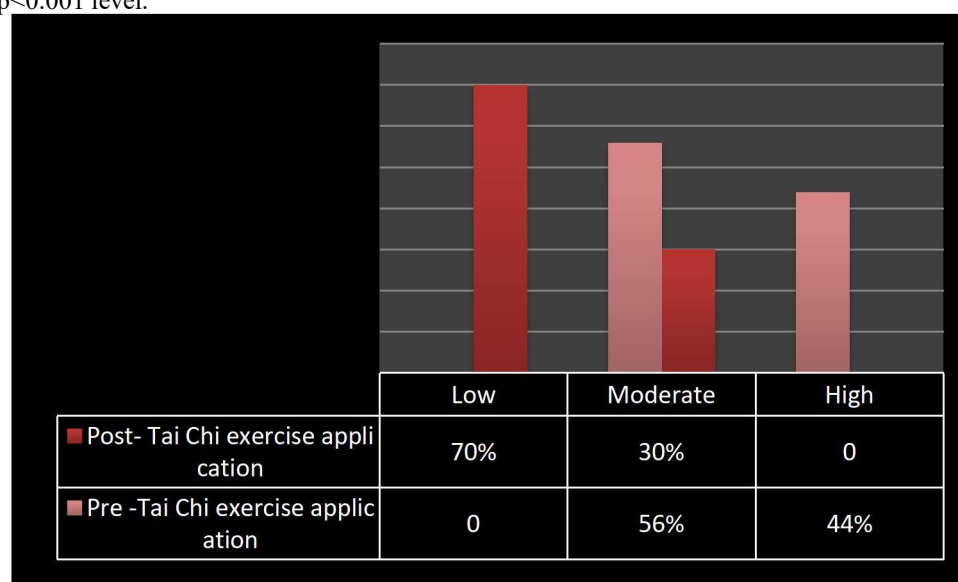


Figure 4: Total anxiety levels among the studied nurse's pre and post-Tai Chi exercise application (n=50)

Discussion:

According to **Hanna and Cronin-Golomb (2018)** and **Riedel et al. (2019)**, anxiety and stress

disorders are typical nonmotor mental comorbidities in idiopathic Parkinson's disease that lead to lower quality of life, more care reliance, and greater caregiver discomfort. 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.

Regarding the personal characteristics of the studied nurses, the results of the current study indicated that fewer than half of the nurses who were evaluated were in the 20–30 age range. Most of them were female in terms of gender. According to the study, this might be because there are more women than men in nursing education. **Seferoglu et al. (2021)** discovered that 80% of nurses were female. These findings were made in the same context as their findings. Furthermore, **Mohamed, (2019)** study found that the majority of the nurses in the sample were female and between the ages of 23 and 30. These results are consistent with that study.

About half of the nurses under examination had degrees from nursing technical institutes, according to the study's findings regarding their qualifications. 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 most of the nurses who took part in the survey reported not having taken any Tai Chi fitness training classes. This could be the reason for the lack of understanding of its significance. It demonstrated the need for the nurses under study to take part in similar training programs, according to the researchers.

According to the study, doctors were the primary source of information for almost 75% of the nurses surveyed on Tai Chi exercises. From the perspective of the researchers, it demonstrated that nurses learned from the appropriate source.

According to the current study's findings, the mean stress level among the nurses under investigation was 31.78 ± 4.55 on the pretest. The mean scores of the nurses under study dropped to 12.33 ± 2.23 after applying the Tai Chi exercise, and there was a highly significant statistical difference between the pre-and post-application values. The researchers believed that this demonstrated the benefits of applying Tai Chi exercises, which aid in stress reduction.

Bone marrow transplant (BMT) units are stressful work settings with high staff burnout and anxiety, 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% reported no stress. Furthermore, the outcomes of our research were consistent with earlier studies that discovered Tai Chi lessons considerably enhanced participants' subjective stress levels and mood (**Caldwell et al., 2021**). Similarly, several studies by **Aarsland et al., 2022; Nègre-Pagès et al., 2019** found the prevalence of stress in Parkinson's disease was high. This finding was corroborated by a study 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. This result is matched with **Molassiotis et al., (2022)** who found that sources of stress were found in regular work with dying patients excessive responsibility, rapid advances in transplant technology, and excessive personal demands of patients and families. The majority of staff had experienced difficulties in their personal lives which were directly linked to stress at work. 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 by stress; 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**).

The findings of the present study revealed that anxiety mean scores were lower post-application in comparison to their anxiety mean scores pre-application, with a statistically significant difference among the studied nurse's **pre and post-Tai Chi exercise application**. From the researcher's point of view, it reflected the effectiveness of the Tai Chi exercise **application** which helps in anxiety reduction among the studied nurses **post-Tai Chi exercise application**. Furthermore, a study by **Lin et al. (2021)** examined the impact of Tai Chi exercises on anxiety in participants, and the results showed that Tai Chi exercises reduced anxiety levels among the studied sample.

For twelve weeks, the participants got 50-minute Tai Chi classes three times a week. When comparing the case group's anxiety levels to those of the control group, the results showed that Tai Chi had a favorable impact. Wang (2019) investigated how Tai Chi helped rheumatoid arthritis patients with their pain and performance. 20 patients underwent Tai Chi training twice a week for 12 weeks to achieve this goal. As compared to the control group, the case group's symptoms of anxiety and depression were shown to be less severe. Tai Chi was shown to considerably lower anxiety in **Sattin et al., (2020)**. Furthermore, Tai Chi was reported to greatly lessen the symptoms of despair and anxiety by **Han et al., (2020)**. **Mustian et al., (2020)** found that Tai Chi increased the self-confidence of the participants. **Fransen et al., (2020)** found that Tai Chi did not have any positive effect on reducing stress, anxiety, and depression.

Furthermore, at the one-month follow-up stage, there was no statistically significant difference in the mean scores of stress, anxiety, depression, and self-confidence between the case and control groups, according to the study's data. In a study published in, **Rosario et al., (2020)** examined how schema therapy affected nursing and midwifery students' symptoms of anxiety and despair. Pre-test, post-test, and a two-month follow-up were the three phases of this case-control study. The findings indicated that there was a significant reduction in anxiety and depression symptoms during the two-month follow-up and post-test phases ($P < 0.05$). The present study's findings regarding the decrease in anxiety and depression among nursing students were consistent with those of (**Rosario et al., 2020**).

The current study's findings are also consistent with those of **Wang et al. (2019)**, who found that using Tai Chi exercises can reduce anxiety and treat a few common psychosomatic illnesses. 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 melancholy and anxiety, 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 **Saadeh 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 despair, anxiety, and stress. Most of the research on this topic has looked at how Tai Chi benefits older people or those with chronic illnesses.

Studies on the connection between Tai Chi and the mental and physical well-being of youth have been conducted by others. **Wang et al. (2020)** investigated how Tai Chi affected students' physical and emotional well-being. The benefits of Tai Chi on the pupils' emotional and physical well-being were discovered (**Wang et al., 2020**). The goal of **Lee et al., (2020)** was to look into how Tai Chi can help older people feel better psychologically.

Two one-hour Tai Chi training sessions each week for 24 weeks were provided to the community, which consisted of 72 healthy elderly people on average. The outcomes showed a stress reduction. The beneficial effects of Tai Chi on 78 healthy individuals' blood pressure, cholesterol, and anxiety were also observed by **Tsai et al. (2020)** in their study. Similarly, **Rosario et al. (2020)** presented their concept and implementation of studies to verify the health benefits of tai chi for medical professionals.

Limitation of this study:

The small sample size of this study limited the results' generalizability, which was one of its Limitations.

Conclusion:

Based on the study's findings and hypothesis, it was concluded that nurses who practice Tai Chi experience a significant decrease in their mean post-test stress and anxiety.

Recommendations:

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

- It is highly recommended that a training program for nurses to be able to incorporate Tai Chi exercises into their regular care should be provided.
- Further research and replication of this work with a larger sample size are required to allow for generalization.

References:

- Aarsland, D., Pålhlagen, S., Ballard, C., Ehrt, U., & Svenningsson, P.. (2022). Stress in Parkinson's disease—epidemiology, mechanisms, and management. *Nat Rev Neurol*;8:35–47.
- Avanzino, L., Lagravinese, G., Abbruzzese, G. & Pelosi, E. (2018). Relationships between gait and emotion in Parkinson's disease: a narrative review. *Gait Posture* 65, 57–64.
- Bishop, M., & Keating, A., (2019). hematopoietic stem cell transplantation, Goldman- Cecil Medicine, 26th edition, Elsevier, available <https://www.clinicalkey.com>
- Caldwell, K., Emery, L., Harrison, M., & Greeson, J. (2021). Changes in Mindfulness, Well Being, and Sleep Quality in College Students through Taijiquan Courses: A Cohort Control Study. *The Journal of Alternative and Complementary Medicine*, 17, 931–938. <https://doi.org/10.1089/acm.2010.0645>
- Carey, G. (2021). Neuroimaging of anxiety in Parkinson's disease: a systematic review. *Mon. Disord*. 36, 327–339.
- Caroline, F. & Edith, J. (2019): The Practices and Meanings of Care for Nurses Working on a Pediatric Bone Marrow Transplant Unit, May/Jun;34(3):214–221.,doi: 10.1177/1043454216688637. Epub 2017 Feb 10, DOI: 10.1177/1043454216688637
- Cheung, T.C.Y., Liu, K.P.Y., Wong, J.Y.H., Bae, Y.H., Hui, S.S., Tsang, W.W.N., Cheng, Y.T.Y., & Fong, S.S.M. (2018). Acute Effects of Tai Chi Training on Cognitive and Cardiovascular Responses in Late Middle-Aged Adults: A Pilot Study. *Evid. Based Complement. Altern. Med.*, 2018, 7575123.
- Christianson, J. (2022). Tai Chi as a possible way to reduce cardiovascular risk factors in firefighters. University of Cincinnati; 2022.
- De Micco, R. (2021). Connectivity correlates of anxiety symptoms in drug-naive Parkinson's disease patients. *Mon. Disord*; 36, 96–105.
- Esch T, Duckstein J, Welke J, Braun V. (2020). Mind/body techniques for physiological and psychological stress reduction: stress and anxiety management via tai Chi training - a pilot study. *Med Sci Monitor: Int Med J Experimental and Clinical Res*. 13:CR488–97.
- Felfly, H., & Haddad, G., (2024). "Hematopoietic stem cells: potential new applications for translational medicine". *Journal of Stem Cells*. 9(3):163–97. PMID 25157450.
- Fransen, M., Nairn, L., Winstanley, J., Lam, P., & Edmonds, J. (2020). Physical activity for osteoarthritis management: A randomized controlled clinical trial evaluating hydrotherapy or Tai Chi classes. *Arthritis Rheum*; 57(3):407–14. doi: 10.1002/art.22621. [PubMed: 17443749]
- Gothe, N., & Kendall, B. (2020). Barriers, motivations, and preferences for physical activity among female African American older adults. *Gerontol Geriatr Med*; 2:2333721416677399.
- Guohua, Z. (2019). Assess the effectiveness and safety of Tai Chi Chuan (TCC) on physical and psychological health. *Int J Behav Sci*; 4(1); 605–617.
- Han, A., Robinson, V., Judd, M., Taixiang, W., Wells, G., & Tugwell, P. (2020). Tai Chi for treating rheumatoid arthritis. *Cochrane Database Syst Rev*; (3). CD004849. doi: 10.1002/14651858.CD004849.
- Hanna, K. & Cronin-Golomb, A. (2018) Impact of anxiety on quality of life in Parkinson's disease. *Parkinson's Dis*; 640707.
- Huang, J., Qin, X., Shen, M., Xu, Y., & Huang, Y. (2021). The effects of Tai Chi exercise among adults with chronic heart failure: an overview of systematic review and meta-analysis. *Front Cardiovasc Med*;8:589267.
- Ives, J.C.; & Sosnoff, J. (2020). Beyond the mind-body exercise hype. *Physician Sportsmed*, 28, 67–81.
- Judith, E., Arnetz, M., & Goetz, A. (2020). Nurse Reports of Stressful Situations during the COVID-19 Pandemic. *IJERPH*; 62(3): 783–787.
- Lan, C., Chen, S-Y., & Wong, M-K. (2019). Tai chi chuan exercise for patients with cardiovascular disease. *Evid Based Complement Alternat Med*; 983208.
- Lee, L., Lee, D., & Woo, J. (2020). Effect of Tai Chi on state self-esteem and health-related quality of life in older Chinese residential care home residents. *J Clin Nurs*; 16(8):1580–2. Doi: 10.1111/j.1365-2702.2007.02061.x.
- Lin, C. J., Benignant, K., & Duckstein, J. (2021). Impact of Tai Chi exercises on anxiety for people with Parkinson's? A phenomenological study. *PLoS One* 16, e0249390.
- Mahdy, A. (2019). effect of a Training Program on staff nurses' performance and Empowerment toward

- the care of the patient undergoing Organ and tissue transplantation
- Mohamed, A. (2019). Bone marrow transplantation coordinator, Vol92- 20/ April/post-graduate medicine., pp12-15.
 - Molassiotis ,O., van den, B., & Boughton, S. (2022). Psychological stress in nursing and medical staff on bone marrow transplant units, Mar;15(3):449-54Aug;16(2):328,
 - Mustian, K., Katula, J., Gill, D., Roscoe, J., Lang, D., & Murphy, K. (2020). Tai Chi Chuan, health-related quality of life and self-esteem: a randomized trial with breast cancer survivors. *Support Care Cancer*; 12(12):871–6. Doi: 10.1007/s00520-004-0682-6.
 - Nègre-Pagès, L., Grandjean, H., Lapeyre-Mestre, M., Montastruc, J., Fourier, A., & Lépine J. (2019). Anxious and stress symptoms in Parkinson's disease: the French cross-sectional DoPa MiP study. *Mov Disord.*;25(2):157–66.
 - Pan, L., Yan, J., Guo, Y., & Yan, J. (2019). Effects of Tai Chi training on exercise capacity and quality of life in patients with chronic heart failure: a meta-analysis. *Eur J Heart Fail*;15:316–23.
 - Pavlos, S., & Eirini, R. (2019). The impact of occupational stress on nurses' caring behaviors and their health-related quality of life. *NLM, BMC Nurs.* ; 15(3): 11-17.
 - Rica, S., & Brinda, A. (2021). Indian professionals suffer higher stress levels than most workers globally. *The Economic Times/News*. [Cited 2021Oct 28]. Available from: <https://economictimes.indiatimes.com>.
 - Riedel, O., Dodel, R., Deuschl, G., Klotsche, J., Förstl, H. & Heuser, I. (2019). Depression and care-dependency in Parkinson's disease: Results from a nationwide study of 1449 outpatients. *Parkinsonism Relat Disord*; 18: 598–601.
 - Rosario, A., Barbara , D., William Longo, M., Alice Mannocci, S., & Giuseppe, T. (2020). Tai Chi and Workplace Wellness for Health Care Workers: A Systematic Review, *Int. J. Environ. Res. Public Health*, 17, 343; doi:10.3390/ijerph17010343.
 - Saedeh Kabiri Dinani 1 , Tayebbeh Mehrabi 2, * and Reza Sadeghi , Published online 2022 July 6. doi: 10.5812/jjcdc.92854. Research Article The Effect of Tai Chi Exercise on Stress, Anxiety, Depression, and Self-Confidence of Nursing Students, *Jundishapur Journal of Chronic Disease Care*
 - Sattin RW, Easley KA, Wolf SL, Chen Y, Kutner MH. Reduction in fear of falling through intense tai chi exercise training in older, transitionally frail adults. *J Am Geriatr Soc*. 2020;53(7):1168–78. doi: 10.1111/j.1532- 5415.2005.53375.x.
 - Spielberger C. (1972): Anxiety as an emotional state. *AnxietyCurrent Trends and Theory*. New York: *Academic Press*; 24-49.
 - Steffen, A., Nübel, J., Jacobi, F., Bätzing, J., & Holstiege, J. (2020). Mental and somatic comorbidity of depression: a comprehensive cross-sectional analysis of 202 diagnosis groups using German nationwide ambulatory claims data. *BMC Psychiatry*; 20:142.
 - Tang, H., & Gu, L. (2022). The history and development of Tai Chi. *Study on Tai Chi Beijing: People's Sports Publishing House of China*; 1–4.
 - Tsai, J., Wang, W., Chan, P., Lin, L., Wang, C., & Tomlinson B. (2020). The beneficial effects of Tai Chi Chuan on blood pressure and lipid profile and anxiety status in a randomized controlled trial. *J Altern Complement Med.*; 9(5):747–54. doi: 10.1089/107555303322524599.
 - Wade, C.; Chao, M.; Kronenberg, F.; Cushman, L.; & Kalmuss, D. (2018). Medical Pluralism among American Women: Results of a National Survey. *J. Womens Health (Larchmt)*, 17, 829–840.
 - Wang, C. (2018). Tai Chi improves pain and functional status in adults with rheumatoid arthritis: Results of a pilot single-blinded randomized controlled trial. *Med Sport Sci*; 52:218–29. doi: 10.1159/000134302.
 - Wang, Y., Taylor, L., Pearl, M., & Chang, L. (2020). Effects of Tai Chi exercise on the physical and mental health of college students. *Am J Chin Med*; 32(3):453–9. doi: 10.1142/S0192415X04002107. [PubMed: 15344428].
 - Wang, F., Lee, E., & Wu, T. (2019). The effects of tai chi on depression, anxiety, and psychological well-being: a systematic review and meta-analysis. *Int J Behav Med*; 21:605–17.
 - Wang, Y. (2018). Tai Chi Exercise and the Improvement of Mental and Physical Health among College Students. In Y. Hong (Ed.), *Tai Chi Quan: State of the Art in International Research (Medicine and Sport Science*; 52, 135-145.
 - Yazhini, K. Anusia, P. & Sagayamary. (2024). A Study to assess the effectiveness of Tai Chi exercise on stress among staff Nurses in selected private hospitals at Thanjavur. *Asian Journal of Nursing Education and Research*; 14(1):46-0.
 - Zhao, J., Chau, J., Lo, S., Choi, K., & Liang, S. (2021). The effects of sitting Tai Chi on physical and psychosocial health outcomes among individuals with impaired physical mobility: a systematic review and meta-analysis. *Int J Nurs Stud*;118:103911