

Effect of Tai Chi Exercises Program on the Quality of Life for Osteoarthritis Patients

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Abstract:

Background: Osteoarthritis is one of the most frequent chronic diseases that can lead to loss of quality of life. Tai chi is a popular form of exercise among older adults, it encompasses balance, aerobics, flexibility, and weight-bearing exercise with meditation and deep breathing. This study **aimed** to evaluate the effect of Tai Chi exercises program on the quality of life for osteoarthritis patients. **Design:** A quasi-experimental research design with one group pre-post was used to conduct the study. **Setting:** The study was conducted at Outpatient orthopedic Clinic in Benha University Hospital, Egypt. **Sample:** A purposive sample of 86 osteoarthritis patients was included. **Tools:** Three tools were used; **1)** A structured interviewing questionnaire to collect data about the patients' demographic characteristic, medical history, and patients' knowledge related to osteoarthritis, **2)** Mastery Scale was used to assess psychological coping level (Mastery level); **3)** Quality of life assessment tool the 36-item Short-Form Health Survey was used. **Results:** Revealed that improving mean and standard deviation of studied patients' knowledge post program compared by preprogram. There were highly statistical significant differences regarding all knowledge items between pre and post program implementation ($P < 0.001$). There was improvement in quality of life for osteoarthritis patients post program Tai Chi exercises with highly statistical significance. About 65.1 % of the studied osteoarthritis patients had low total mastery upon osteoarthritis which decreased to 7% post program implementation. While high total mastery upon osteoarthritis was found on 3.5% of the studied patients that increased post program to 43.0%. **Conclusion:** Implementation of a Tai Chi exercise program showed positive impact and effective improvement in knowledge, mastery, and quality of life, raising awareness, and improving outcomes among patients with osteoarthritis. **Recommendation:** Adequate scientific brochure or booklets should be provided for patients with osteoarthritis in orthopedic clinics, with explanation of Tai Chi exercise.

Keywords: Osteoarthritis, Quality of Life, Tai Chi Exercises program.

Introduction:

Osteoarthritis (OA), which outranks other types of joint disease like rheumatoid arthritis as the major cause of pain and stiffness in middle-aged and elderly people and encourages compensatory behaviors, is one of the ten

chronic diseases that are most disabling and one of the most expensive. It is a long-term health condition that has no cure, is increasing in prevalence and is posing a major burden on individuals, health care systems and society in general. It can lead to permanent joint damage

that leads to limit and a decline in function affecting the joint cartilage most frequently in the hands, hips and knees. It can result in long-term joint injury that impairs mobility and decreases function, most typically affecting the cartilage in the hands, hips, and knees. The bone beneath this joint starts to deteriorate and alter. These changes mainly affect quality of life (**Aily and Barton, 2020**).

In OA joints, one might see pathological alterations that come in a variety of forms or stages (stage 1 to 4 - minor, mild, moderate and severe). These pathological alterations include articular cartilage loss and degradation, subchondral thickening, osteophyte formation and synovial inflammation, degeneration of the knee ligament and menisci, and joint capsule enlargement. Physical impairments can include joint enlargement, changed muscle function, poor proprioception and postural control, instability in the joint, restricted joint ROM (range of motion), fitness, and weakness in the muscle and associated **tissues (Shilpi and Manashi 2022)**.

The most prevalent articular disease in developed nations is osteoarthritis, which can lead to joint failure and permanent disability. One of the most common diseases that cause impairment, especially in the elderly, is OA. Particularly after menopause, women are more likely than men to be diagnosed with OA in their hands and knees (**Kloppenborg & Berenbaum, 2020**).

Tai Chi is a multi-beneficial traditional Chinese exercise improving health and function in knee OA that has been developed in China in the 17th century practiced for many centuries as a “meditative martial art. The practice involves a series of sequentially performed continuous gentle, smooth movements to strengthen.

Although there are various forms of Tai Chi, all of them involve relaxation of the body and mind, bodily integration, fluidity of movement, breathing regulation, and mental focus. The practise of Tai Chi has several advantages. It can strengthen the immune system, enhance posture and balance, increase strength and flexibility, boost mood, and promote physical and mental health (**Po-Yin et al, 2021**).

Additionally, prior studies showed that tai chi practice has positive effects on degenerative OA. Tai chi exercises were found to improve walking ability, balance, lower limb muscle strength, and reduce pain among elderly people with knee osteoarthritis when performed three times per week for 24 weeks. A systematic review and meta-analysis study also shown that tai chi has the potential to enhance knee extensor and walking strength, as well as to relieve pain and stiffness in people with arthritis (**Duray and Genc, 2017**). Little is known about the effects of tai chi exercises on the overall functional fitness of the upper and lower extremities in elderly people with a knee joint prognosis despite multiple researches revealing the beneficial effects on muscle strength, balance, and walking ability of the lower extremities which affects overall functional performance, activities of daily living (**Zou et al.2019**).

Quality of life is an index for evaluating long-term outcomes used in patients with various chronic diseases, such as arthritis and diabetes. It is an assessment of the extent and value of life focusing on an individual's social, cultural, and environmental surroundings. Older adults with osteoarthritis experience low health-related quality of life as well as physical and mental health issues. In comparison to older adults without osteoarthritis, older adults with

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osteoarthritis experience worse health problems, limitations in everyday activities, and falls brought on by the disease's symptoms including pain and stiffness. Furthermore, people with osteoarthritis report more depression than healthy older adults or those without arthritis (**Do-Youn Lee and Seong-Gil Kim, 2020**).

Nurses have a critical role in the comprehensive assessment and care of osteoarthritis patients. They can improve management by ensuring that all patients receive the three basic therapies of information, activity, and exercises, as well as weight-loss strategies when necessary, through adequate health education and training programs (**Al-Omari and Hill, 2020**).

Significance of the Study

Osteoarthritis (OA), is the 2nd most common rheumatologic problem and one of the tenth leading causes of non-fatal burden that affects 240 million people globally. Its prevalence was approximately 4% in the last five years estimate 9.6% of men aged over 60 years and 18.0% of women of the same age group have symptomatic OA (**Zugui et al, 2022**).

In Egypt, OA cases in rural and urban regions are more than five million. More than 30 percent of women have some degree of osteoarthritis by age 65. Other risk factors for osteoarthritis include prior joint trauma, obesity, and a sedentary lifestyle (**Gheita, Eesa, 2019**).

Aim of the Study:

The aim of this study was to evaluate the effect of Tai Chi exercises program on quality of life for osteoarthritis patients. This was done by achieving the following objectives:

- Assessing the level of knowledge regarding osteoarthritis among the studied patients.
- Assessing the level of mastery among osteoarthritis patients.
- Assessing the level of osteoarthritis patients' quality of life.
- Designing and implementing Tai Chi exercises program for osteoarthritis patients.
- Evaluating the effect of Tai Chi exercises program on quality of life for osteoarthritis patients.

Research Hypotheses:

H.1: Patients' level of knowledge regarding osteoarthritis will be improved post implementation of the program.

H.2: The level of mastery among osteoarthritis patients will be increased post implementation of the program.

H.3: Osteoarthritis patients will experience high quality of life level post implementation of the program.

Subjects and Methods

Research design:

A quasi-experimental design (one group pre-post) was selected for conducting this study.

Research setting:

This study was conducted at the outpatient orthopedic clinic in Benha University Hospitals. Egypt.

Sample type and criteria:

A purposive sample composed of 86 osteoarthritis patients from the previously mentioned setting were chosen during the period from December 2021 to March 2022 according to the following **inclusion criteria:** from both sexes, their age ≥ 60 years old and who were medically diagnosed with

osteoarthritis, able to follow instructions and willing to participate in the study. **Exclusion criteria:** Patients with mental problems or unable to read or write.

Tools for data Collection:

Data were collected by using three tools.

Tool I: An interviewing questionnaire was developed by the researchers including three main parts:

Part 1: Related to the socio-demographic data of the study subjects; including age, gender, occupation, and residence.

Part 2: Medical history of osteoarthritis patients: included five questions about; onset of arthritis in years, affected joint, treatment method, pattern of pain, and factors affecting pain intensity.

Part 3: Was concerned with the studied patients' knowledge related to osteoarthritis includes meaning of osteoarthritis, causes, signs & symptoms, preventive measures, treatment and complications. This part was used pre- post program implementation.

Scoring for knowledge:

A scoring system was developed to gauge the level of knowledge of the patients. Each question included a set of answer points, with the correct answer receiving a score of 2, the incomplete correct answer receiving a score of 1, and the answer of didn't know/incorrect receiving a score of 0. The mean score for the portion was calculated by adding the item scores together and dividing the result by the number of items. If the score is greater than 75%, it is regarded as having good total knowledge, between 50 and 75%, average total knowledge, and less than 50% as having poor total knowledge.

Tool II: Mastery Scale; Adopted from (Pearlin&Schooler, 1978) designed to assess psychological coping level (Mastery level). Consists of seven items, five of which have negative wording and two of which have positive wording. It is presented on a Likert scale with four possible responses. Strongly Disagree (1) is followed by Disagree (2), Agree (3), and Strongly Agree (4). Prior to scoring, the negatively worded items must undergo reverse coding, yielding a score range of 7 to 28 points, with higher scores denoting higher levels of mastery.

Mastery scoring:

The following criteria were developed as a scoring system for patients' mastery:

- Low mastery, when the total score < 25% (< 7 points).
- Mild mastery, when the total score from 25% to < 50% (7 - <14 points).
- Moderate mastery, when the total score from 50% to < 75% (14 - <21 points).
- High mastery, when the total score \geq 75% (\geq 21 points)

Tool: III; Quality of life (QOL) assessment tool (SF-36). Adopted from (Laucis et al., 2015), QOL was measured by the Medical Outcomes Study SF-36. A validated self-administered questionnaire comprised of 36 items to assess QOL of osteoarthritis patients, which are used to derive eight health subscales: physical functioning (10 Question), role physical (limitations due to physical health) (4 Question), bodily pain (2 Question), general health (6 Question), vitality (4 Question), social functioning (2 Question), role emotional (limitations related to emotional problems) (3 Question), and mental health (5 Question).

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Scoring system:

All questions are scored on a scale from 0 to 100, with 100 representing the highest level of functioning possible. Aggregate scores are compiled as a percentage of the total points possible. The scores from those questions that address each specific area of functional health status are then averaged together, for a final score within each of the 8 dimensions measured. The total score of quality of life was calculated as follows: low when the total score < 50%, moderate when = 50%-75%, high when > 75%.

Validity and Reliability:

Five professional experts from the fields of Geriatric Nursing and Community Health Nursing validated the content. The developed tool was examined to determine whether the items were appropriate, and concepts were measuring correctly. Adjustment and modifications were made in accordance. The tool's relatively homogeneous item composition was indicated by using Cronbach's Alpha coefficient test to assess the reliability. The knowledge of the patients had an internal consistency of 0.81.

Ethical Consideration:

All ethical concerns were addressed; prior to the interview, formal consent and agreement were obtained from each patient, and they were given a brief explanation of the study's goals. They were also told that all data collected would be kept private and utilized just for the study. The patient was free to leave the study whenever they wanted, without having to give a reason.

Preparatory phase:

The researchers reviewed current local and international related literature, which helped to be more acquainted with the topic using

articles, books, and internet, and with the process of study tool construction. Then, tool was designed and tested for being valid through a pilot study.

Pilot Study:

The pilot study was conducted on 8 osteoarthritis patients who represented 10% of the sample size from the same study setting to test content, clarity, applicability, and consistency of the tools using the interviewing questionnaire as a pre-test sheet. No modifications were made, so the pilot study sample was included in the total sample.

Field Work:

The following steps were taken to collect data over the four-month period:

- An official letter was delivered from Faculty of Nursing Benha University to the Orthopedic Outpatient Clinic Administrator to have permission for performing the study. The official letter contained the title and the aim of the study.
- During conducting interviews with the patients, the researchers introduced themselves and described the study's objectives to them. Patients attended to the clinic two days a week.
- The study tools were taking about 30- 45 minutes to be collected for each patient.

Intervention:

Tai Chi program:

The program content was constructed in four phases: assessment, followed by planning, after that implementation, and then evaluation. The Tai Chi program aim was to improve patient's general knowledge regarding osteoarthritis and related quality of life.

The four phases of Tai Chi program were as the following:

1. Assessment phase:

This phase encompassed interviewing the osteoarthritis patients in the waiting room of the

orthopedic clinic to collect baseline data, at the beginning of interview the researchers greeted each patient, explained the purpose, duration, and activities of the study. Pre-test was done to assess patients' knowledge, mastery and quality of life. The data obtained during this phase constituted the baseline to evaluate the effect of Tai Chi program. Average time for the completion of filling tools was around 30-45minutes.

2. Planning phase:

Based on the outcome of the assessment phase, the Tai Chi program sessions were designed after reviewing of the related literature. Detected needs and deficiencies were changed into aim to evaluate the effect of the program sessions for osteoarthritis patients. The program was developed by the researchers in a form of printed Arabic booklet included knowledge about osteoarthritis as: Meaning, causes, sign and symptoms, preventive measures, treatment and complications. Also contain practices of Tai Chi exercises such as: Tai Chi warm up exercises, Tai Chi chair exercises and Tai Chi balance exercises adopted from (Maurice, 2021). The teaching methods were: Lectures, role play and demonstration. And teaching media were booklet, videos and posters.

3. Implementation phase:

The data was collected before and after Tai Chi program, it takes 4 months from the beginning of December 2021 to the end of March 2022. The total number of patients was 86 patients. They were divided into 13 groups each group composed of 6-7 patients. The researchers interviewed 1-2 groups/week in the waiting area of the clinic.

The designed program was provided for the patients through 5 sessions (2 theoretical

and 3 practical), the duration of each session was 30-45 minutes, done in 2 days/week in orthopedic outpatient clinic from 9 a.m. to 12.00 p.m. The first two sessions concerned with the theoretical content of the program, and the other three sessions about practical content (Tai Chi exercises) which started with the importance of these exercises for osteoarthritis patients and followed by steps of each exercise as the following:

Elderly Tai Chi Warm Up Exercises

1. Waist Loosening:

- Let your arms hang loosely by your side while you stand with your feet slightly wider than hip width apart.
- Rotate your left hip back and your right hip forward. Remember to continue your movements and repetitions.
- Now move your left hip forward while moving the other way.
- Your flailing arms against your sides. It resembles a strange, sluggish variation of "doing the twist."
- Keep going for up to two minutes, or until you start to feel warm.
- You have the choice to accentuate the mobility of the neck and shoulders.



2. Twisting the Torso:

- Place your feet slightly farther apart than hip width.

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- Your hands should be on your hips.
- As you inhale, lengthen your spine.
- As you exhale, turn your torso to the left. You have some, but very limited, hip mobility. Keep your knees above ankles. Knees can bend somewhat, but they shouldn't twist or bend unevenly.
- Revolve to the right.
- Breathing and movement should be coordinated.
- Repeat 5–10 times on each.



3. Leg Warm Up

- Place your feet slightly farther apart than hip width.
- Place your hands by your sides or on your hips. Or you could rest both of your hands on a chair's back.
- Place your left leg under your body weight. The movement should be controlled, slow, and inch by inch.
- Inhale while placing all of your weight on your left leg.
- After exhaling, slowly switch to your right leg.
- Do this 5–10 times.



Elderly Tai Chi Chair Exercises

4. Broadening:

- Keep your back straight and space your feet out to shoulder width while you are sitting or standing.
- Keep your arms at your sides.
- Extend your arms straight in front of you at roughly shoulder level while taking a deep breath.
- Let your shoulders unwind as you exhale.
- Breathe in deeply and extend your arms out wide as if welcoming someone for a hug. Let your shoulders unwind once more.
- Breathe out as you lower your hands to your sides after bringing them back to the center.
- Do this 5–10 times.



5. Holding the Ball

- Keep your back straight and your elbows at approximately 90 degrees as you hold the ball, real or imaginary, out in front of you.
- Rotate the "ball" to the left while bending at the waist. Turn your hands so that your left hand is at around shoulder height and on top (or as high as is comfortable).
- Turn your hands so that your left hand is at around shoulder height and on top (or as high as is comfortable).
- Turn your head so your eyes can follow the ball.
- Move the ball to the right after returning to the starting position.
- 5–10 times, then stop.



6. Scooping from the Sea:

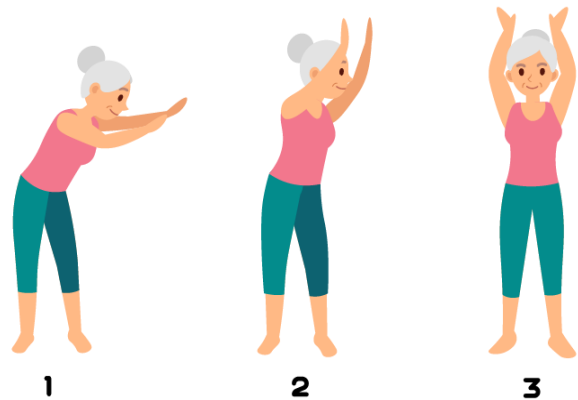
- Take a seat.
- Shift a little of your weight to the left while bending forward over your left knee.
- Extend your arms past your left knee, palms facing up and wrists crossed.
- Breathe in as you lift your arms, spread them apart, and shift your weight to the right.
- Lift your arms as high as you are able to while keeping your palms facing back. Take a moment to throw that seawater behind you.
- Breathe out as you lower your arms back down to rest with your wrists crossed over your right knee.
- Do this five times over each knee.



- Form a teapot pointing the other way as you breathe in.
- Do this five times on each side.



8. Windmill:



- Place your feet shoulder-width apart when standing.
- Relax your shoulders and let your arms dangle by your sides.
- Extend your arms in front of you, palms up, fingers pointing downward.
- Breathe in and extend your arms. As you raise them directly over your head, windmill them out slightly to the left and then back to the centre.
- Inhale out, and then lower. As you make your way back to the starting point, windmill to the right.
- For the following rep, move up to the right and down to the left.
- Do 5 repetitions on each.

Elderly Tai Chi Balance Exercises

7. Dancing with the Rainbow:

- Settle upright.
- Put more weight to your right.
- Raise your left arm out in front of you while lifting your right arm overhead with your elbow bent. You'll resemble "I'm a little teapot" in certain ways.
- Release your breath, raise your hands aloft, and return your weight to the center.
- Lean left while shifting your weight.

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- Only windmill to the side as far as you can while keeping good balance in the center. It's acceptable to raise your arms straight up without any windmilling.

9. Shooting the Bow:

- Stand with your arms at your sides and your feet shoulder width apart.
- Relax. Knees should be slightly bent, and your back should round.
- Fingers facing you and hands touching, make fists in front of your face.
- Take a deep breath in, turn your waist to the left, and extend your left hand. Leave the elbow slightly bent and open your fist so that the palm is facing outside.
- With your right fist, pull back as though drawing a bow.
- Breathe out and start over.
- Switch sides. 5–10 repetitions per side.



Evaluation phase:

Pre & Post-test:

Following the completion of all sessions, this phase was conducted using the same tools as the pre-test; the post-test was used to measure the effect of the Tai Chi program on osteoarthritis patients.

Administrative approval:

The administrator of Benha University Hospital gave his official approval for the study to be carried out in the orthopedic outpatient

clinic. This is due to letters of request from the Faculty of Nursing at Benha University that were provided to the administrator and clarified the purpose and expected results of the study.

Statistical analysis:

Statistical Package for Social Sciences (SPSS), version 21, was used to organize, tabulate, and statistically analyze the obtained data. The range, mean, and standard deviation were computed for numerical data. Frequencies and percentages were used to present qualitative data. Chi-square analysis was used to compare the groups. Statistical significance was defined as a p-value 0.05. The Pearson's correlation coefficient was used to assess the correlation between the variables (r). Significance was set at p 0.05.

Results:

Table 1 showed that 64.0% of patients were aged 65 to <70 years with a mean age of 67.34 ± 6.98 years. As regards gender, 51.2% of patients were female. Concerning the occupational status, 61.6% of patients weren't working. Regarding the residence, 53.5% of the studied sample was lived in urban area.

Table 2 clarified that, 54.7% of patients had osteoarthritis between the ages of 5 and less than 10 years. Regarding the affected joint, 41.9% of patients had osteoarthritis in knee joints. Also 62.8% of patients treated with physiotherapy and 53.4% of them treated with medications.

Figure 1 illustrated that, 41.9% of patients had arthritis in knee joints followed by 36.0% in wrist joints then 10.5% of patients suffered from neck joints arthritis, 8.1% in shoulders and 3.5% in hip.

Table 3 Displayed that; concerning pattern of pain, 59.3% of patients suffered from intermittent pain and the intensity of pain increased with movement in 45.3 % of patients.

Figure 2 displayed that, 77.9% of osteoarthritis patients had severe pain preprogram which decreased to 0.0% post program. Also, preprogram 22.1% of them had moderate pain that increased to 32.6% post program. Moreover, 0.0% and 0.0% of the studied patients had mild and no pain preprogram which increased post program to 47.7% and 19.8% respectively.

Table 4 revealed that improving mean and standard deviation of studied patients' knowledge post program compared by preprogram including (meaning of osteoarthritis, causes of osteoarthritis, signs and symptoms of osteoarthritis, preventive measures of osteoarthritis, treatment of osteoarthritis, and complication of osteoarthritis). There were highly statistical significant differences regarding all knowledge items between pre and post program implementation ($P < 0.001$).

Figure 3 Illustrated that, 58.9 % of the studied osteoarthritis patients had poor total knowledge regarding osteoarthritis preprogram which decreased to 4% post program implementation. Also, preprogram 7.1% of the studied patients had good total knowledge that increased to 76.8% post program implementation.

Table (5): Indicated that improving mean and standard deviation of studied patients' mastery upon their disease post program compared by preprogram. Also, there were highly statistically significant differences

regarding all mastery items between pre and post program implementation ($P < 0.001$).

Figure 4 presented that preprogram 65.1 % of the studied osteoarthritis patients had low total mastery upon osteoarthritis which decreased to 7% post program implementation. While high total mastery upon osteoarthritis was found on 3.5% of the studied patients that increased post program to 43.0%. Additionally, preprogram 7% of them had moderate total mastery that increased to 20.9% post program implementation.

Table (6): shows that; there was improvement in quality of life for osteoarthritis patients post program with highly statistical significance in all quality-of-life related items ($P < 0.001$).

Figure 5 displayed that preprogram 67.4 % of the osteoarthritis patients studied had low total quality of life which decreased to 0.0% post program implementation. While high quality of life was found on 0.0% of the studied patients that increased post program to 64.0%. Also, preprogram 32.6% of them had moderate total quality of life that increased to 36.0% post program implementation.

Table 7 revealed that there was negative correlation between the studied osteoarthritis patients' total knowledge, total mastery, total quality of life and pain score pre-program implementation, but there was no statistically significant difference, ($P > 0.05$). While post program, there was a highly statistical significant positive correlation between studied patients' total knowledge, total mastery, total quality of life post program implementation, ($P < 0.001$). Also, there was statistical significant positive correlation between total knowledge and pain score ($P < 0.05$).

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Table (1): Distribution of personnel characteristics for the studied osteoarthritis patients (n=86)

Items	No.	%
Age / years		
60-<65	15	17.4
65-<70	55	64.0
≥ 70 years	16	18.6
Mean ±SD	67.34±6.98	
Gender		
Male	42	48.8
Female	44	51.2
Occupation		
Yes	33	38.4
No	53	61.6
Residence		
Rural	40	46.5
Urban	46	53.5

Table (2): Distribution of the studied osteoarthritis patients according to their medical history (n=86)

Items	No.	%
Duration of Illness /Years		
Less than 5	13	5.1
5-< 10 years	47	54.7
≥ 10 years	26	30.2
Treatment *		
Medical	46	53.4
Physiotherapy	54	62.8
Surgical	9	10.5

*Responses are not mutually exclusive

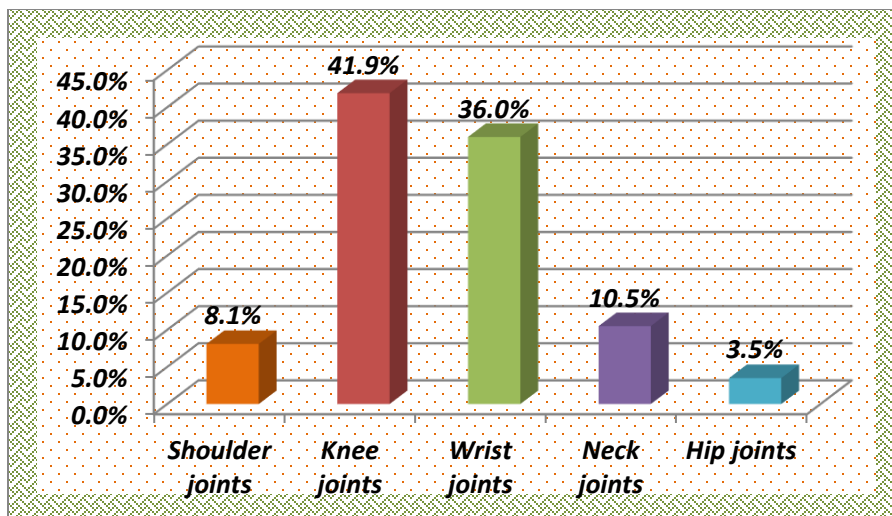


Figure (1): percentage distribution of the studied osteoarthritis patients according to the affected joint.

Table (3): Distribution of the studied osteoarthritis patients according to pain (n=86)

Variables	No.	%
Pattern of pain		
Continuous	35	40.7
Intermittent	51	59.3
Factors affecting pain intensity		
Movement	36	45.3
Standing for long time	39	41.9
Activity	11	12.8

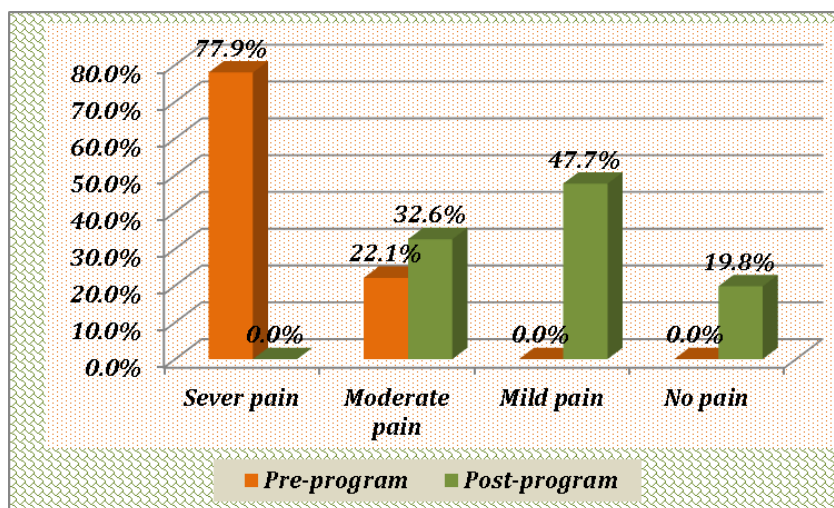


Figure (2): Percentage distribution of the studied osteoarthritis patients according to the severity of pain pre/post program.

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Table (4): Mean knowledge of the studied patients regarding osteoarthritis pre/post program (n=86)

Knowledge	No.	Pre-program	Post-program	Paired t test	P value
Meaning of osteoarthritis	2	.7674±.42494	1.9070±.36390	-16.544	<0.001**
Causes of osteoarthritis	4	1.6047±.49179	3.9070±.36390	-21.362	<0.001**
Signs and symptoms of osteoarthritis	7	2.6163±.55664	5.1279±1.00348	-8.408	<0.001**
Preventive measures of osteoarthritis	6	1.9651±.88713	4.6279±.48620	-32.669	<0.001**
Treatment of osteoarthritis	5	1.5116±.50280	3.8488±.72789	-51.065	<0.001**
Complication of osteoarthritis	6	2.1047±.75192	4.8605±.73825	-21.934	<0.001**
Total knowledge	30	10.5698±1.44337	23.4302±1.68412	-97.082	<0.001**

**P< 0.01 highly significant value

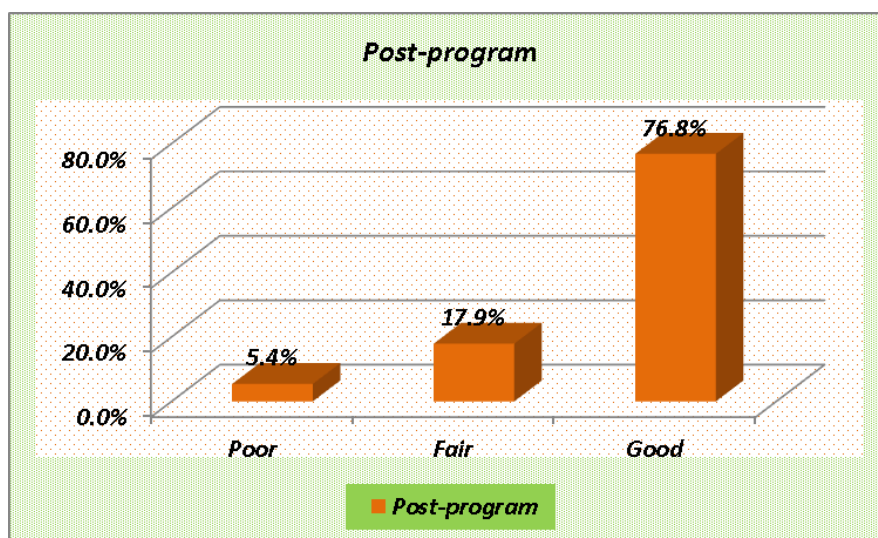


Figure (3): Percentage distribution of the studied patients' total knowledge regarding osteoarthritis pre/post program (n=86)

Table (5): Mean mastery of the studied patients upon osteoarthritis pre/post program (n=86)

Variables (Mastery Scale)	Pre-program	Post-program	Paired t test	P value
I have little control over things that happen to me	1.9767±.71910	2.7907±.82770	-6.727	<0.001**
There is no way I can address some of the problems I face	1.7442±.73862	2.7907±.82770	-8.243	<0.001**
I cannot do much to change many important things in my life	2.1163±.72629	2.8140±.74378	-6.021	<0.001**
I often feel very helpless in dealing with the problems of life	1.8256±.75447	2.9651±1.04541	-8.054	<0.001**
Sometimes I feel driven in life	2.2209±.63987	2.5814±.54157	-3.985	<0.001**
What will happen to me in the future depends on myself often	1.6744±.77371	2.5465±.90303	-6.500	<0.001**
I can do almost anything I decide in myself to do	2.4302±.64243	2.8372±.45660	-4.791	<0.001**
Total mastery	13.9884±2.30852	19.1977±4.23381	-9.770	<0.001**

**P< 0.01 highly significant value

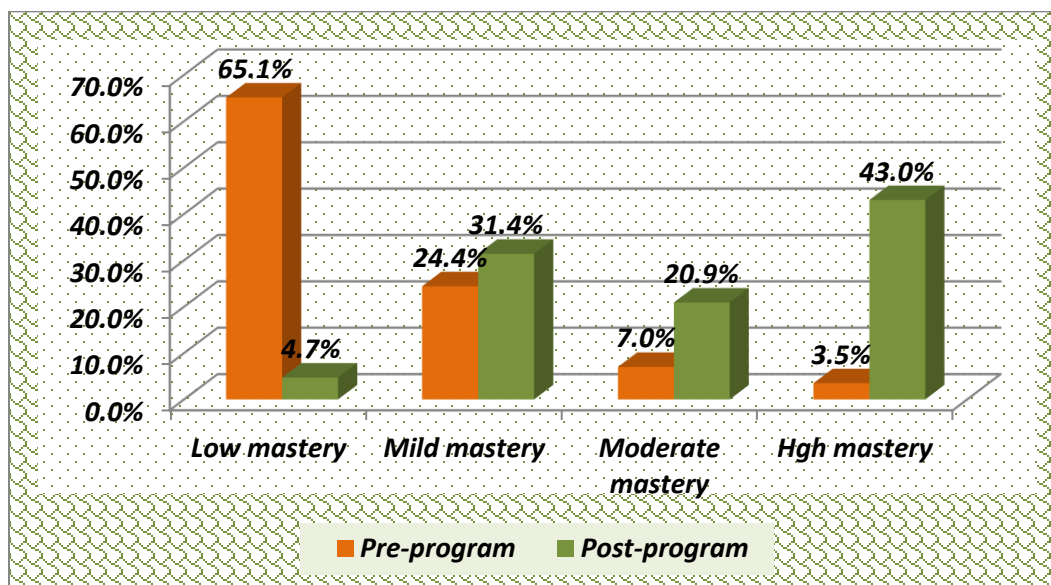


Figure (4): Percentage distribution of the studied patients' total mastery upon their osteoarthritis pre/post program (n=86)

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Table (6): Mean quality of life among the studied osteoarthritis patients pre/post program (n=86)

Variables	Item	Score	Pre-program	Post-program	Paired t test	P value
General health	1	100	37.90±9.95	75.11±5.89	-39.368	<0.001**
Physical health	10	1000	406.97±90.47	75.11±5.89	33.325	<0.001**
Role limitation	4	400	163.95±68.44	279.06±53.39	-10.801	<0.001**
Role limitation due to emotional	3	300	186.04±51.24	227.90±71.37	-3.839	<0.001**
Energy & fatigue	4	400	170.93±61.100	265.11±69.90	-11.783	<0.001**
Emotional health	5	500	209.30±71.33	348.83±50.27	-15.330	<0.001**
Social function	2	200	94.18±74.12	162.79±36.93	-7.571	<0.001**
Pain	2	200	168.02±38.28	98.83±59.52	-8.897	<0.001**
General health perception	5	500	209.30±62.54	343.02±52.11	-15.975	<0.001**
Total quality score	36	3600	1577.4419±282.519	2595.4651±159.223	-28.456	<0.001**

**P< 0.01 highly significant value

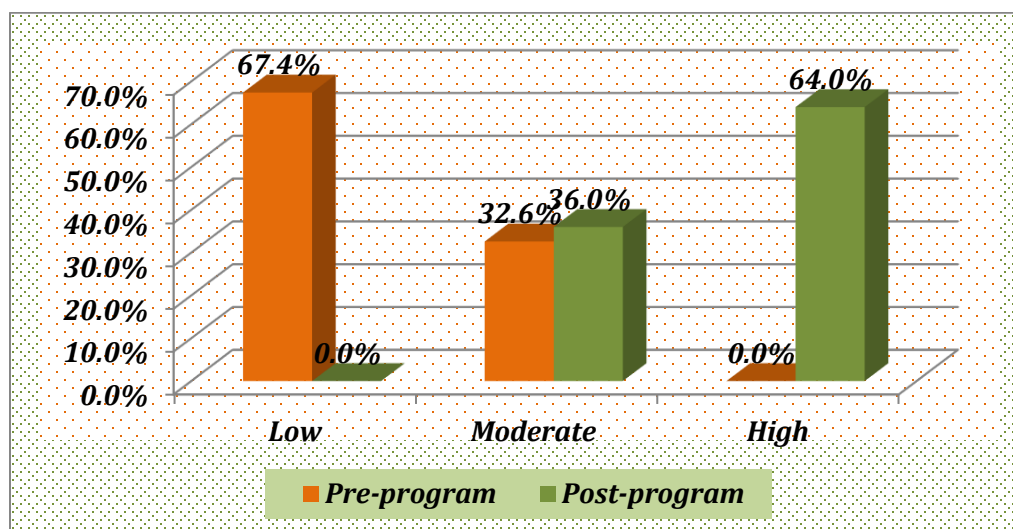


Figure (5): Percentage distribution of the studied osteoarthritis patients' total quality of life pre/post program (n=86)

Table (7): Correlation among the studied osteoarthritis patients' total knowledge, total mastery, total quality of life and pain score pre/post-program

Variables	Mastery		Quality of life		Pain score	
	r	P value	r	P value	r	P value
Total knowledge score (pre-program)	0.058	>0.05	0.039	>0.05	0.008	>0.05
Total knowledge score (post-program)	0.384	<0.001**	0.462	<0.001**	-0.285	<0.05*

**P< 0.01 highly significant value

Discussion:

Osteoarthritis is a prevalent musculoskeletal disease resulting in progressive degeneration of the hyaline articular cartilage within synovial joints associated with significant health and economic burden to patients and society (Masson & Krawetz, 2020). Tai Chi (TC), one of the traditional Chinese skills, is a defensive exercise with moderate intensity. It has become one of the most popular forms of exercise, which is rich in content and easy to learn, and is not restricted by space and time (Zheng, 2021). The aim of the present study was to evaluate the effect of Tai Chi exercise on quality of life for osteoarthritis patients. The present study was framed on the light of the study hypothesis.

Regarding personal characteristics of the studied patients, the results showed that around two thirds of patients were aged 65 to <70 years with a mean age of 67.34 ± 6.98 years; this may be due to consider this age more vulnerable to osteoarthritis and its complications because cartilage naturally deteriorates and the smooth tissue that cushions joints become more easily and disappears with advanced age. More than half of them were female and living in urban area. Less than two thirds of patients were not working; this may be attributed to hormonal factors play a key role in the development of osteoarthritis and during menopause the women more liable to deficiency of estrogen hormone leading to muscles and joint weakness. This finding is consistent with the findings of Mohsen et al., (2021), who studied "The Effects of Nursing Intervention on Knowledge and Practice among Elderly with Knee Osteoarthritis" and found that the mean age of the patients studied was 66.2 ± 6.4 years, with most of them not working. Consistent with

Mark and Ebell (2018), who found that the risk factors for osteoarthritis included being over 50 years old and being female.

Furthermore, Cartasa et al. (2018) investigated "The perception of quality of life in osteoarthritic patients, as well as their sociodemographic and clinical characteristics. Colombiana "and proposed that certain female-specific situations, such as higher rates of obesity, lower muscle tone, and more frequent joint hypermobility, result in varying levels of joint instability that favors the occurrence of repetitive micro trauma, resulting in irreversible joint damage.

Additionally in agreement with Amin et al., (2019) who reported Viscosupplementation for Management of Knee Osteoarthritis from an Indian Perspective " and reported that the female-to-male ratio was 2.1:1. So the women had a higher prevalence of osteoarthritis than men.

Concerning medical history of the studied patients, the present study showed that more than half of patients had osteoarthritis from 5 to less than 10 years and more than two fifths of them had osteoarthritis in knee joints. Also about two thirds of patients treated with physiotherapy and more than half of them treated with medications. This may be due to the insufficient knowledge about other methods of treatment for osteoarthritis and lack of awareness about importance of follow up visiting to the specialized clinics to receive care in first stage of disease. These findings are consistent with Sharma's (2021) discovery that knee osteoarthritis is one of the most common chronic joint diseases, resulting in pain, physical functional limitations, and a low

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quality of life. Also in line with **Sariet et al., (2019)**, who investigated "A better way to decrease knee swelling in patients with knee osteoarthritis" and demonstrated that traditional treatment methods for osteoarthritis include pharmacological interventions and physical therapy.

In aspects of pain patterns, less than two-thirds of osteoarthritis patients experienced intermittent pain, and the intensity of pain increased with movement in more than two-fifths of patients. This finding is consistent with **McDougall et al., (2017)**, who discovered that movement pain is a distinct feature of osteoarthritis pain and occurs primarily during the day and typically during movement. According to the **Australian Institute of Health and Welfare (2020)**, nearly half of people with osteoarthritis described their pain as causing "moderate" to "extreme" interference with their normal work.

Concerning the patients' total knowledge of osteoarthritis before and after the program, the current study found that more than half of the patients had poor knowledge before the program, while more than three quadrants had good knowledge after the program. Furthermore, the current study found that after the program, the mean and standard deviation of the studied patients' knowledge improved when compared to before the program, preventive measures of osteoarthritis, treatment of osteoarthritis, and complication of osteoarthritis). There were highly statistically significant differences between pre and post program implementation for all knowledge items ($P < 0.001$). This could be attributed to the fact that patients should be informed about the nature of the disease and its management. This

also demonstrates the significance of the intervention program in increasing patient knowledge.

This finding was supported by **Akinton et al., (2017)**, who explored "Practice Guidelines for Management of Knee Osteoarthritis" and revealed that study patients had adequate knowledge following nursing guidelines. Also consistent with **Shahat et al., (2020)**, who probed the "Effect of Nursing Guidelines on Knowledge and Quality of Life for Patients with Knee Osteoarthritis in Egypt" and reported that following the implementation of nursing guidelines, the majority of studied patients had an adequate level of knowledge regarding osteoarthritis.

In terms of the mean mastery of the studied patients on osteoarthritis pre/post program, the current study found that the post program improved the mean and standard deviation of the studied patients' mastery of their disease compared to the preprogram. There were also highly statistically significant differences in all mastery items between before and after program implementation ($P < 0.001$). This could be because the intervention program played a significant role in improving the studied patients' disease mastery. This finding is consistent with the findings of **Shahat et al. (2020)**, who found that improving the mean score of studied patients related to planning for the future, being concerned about becoming invalid, and describing arthritis problems had highly statistically significant differences before and after the implementation of nursing guidelines.

Regarding the studied patients' total mastery of their osteoarthritis before and after the

program, the current study revealed that approximately two-thirds of the patients had low total mastery of osteoarthritis, while the other half had high total mastery and the fifth had moderate total mastery. This finding is consistent with the findings of **Hsu et al., (2022)**, who studied "Factors affecting physical activity of people with knee osteoarthritis in southern Taiwan" and found that people with knee osteoarthritis can benefit from improved symptoms and maintain health via moderate physical activity. This finding is also consistent with the findings of **Song et al., (2022)**, who studied "the effect of modified Tai Chi exercises on physical function and quality of life in elderly women with knee osteoarthritis in China" and demonstrated that the effect of Tai Chi on quality of life appears to be associated with improved mental health, including stress reduction, anxiety reduction, depression reduction, mood disorders reduction, and increased self-confidence.

In terms of the severity of pain in the studied osteoarthritis patients before and after the program, the current study found that more than three quadrants had severe pain before the program compared to after the program, about half had mild pain, and about the fifth had no pain. This could be attributed to the fact that Tai Chi exercise prescription should be incorporated into osteoarthritis rehabilitation therapy to improve patient physiological functions and relieve physical pain. This finding is consistent with **Chang et al., (2016)**, who studied "The effects of Tai Chi Chuan on improving mind-body health for knee osteoarthritis patients" and discovered that Tai Chi class training reduces osteoarthritis pain. In line with **Kang et al., (2022)**, who investigated

"Functional outcomes of Tai Chi exercise prescription in women with chronic pain,"

Furthermore, this finding is in accordance with the findings of **Ruojin-Li et al., (2020)**, who examined the "Effectiveness of traditional Chinese exercise for symptoms of knee osteoarthritis" and reported that traditional Chinese exercise may be effective in alleviating pain, relieving stiffness, and improving physical function in patients with osteoarthritis.

Regarding the mean quality of life among the studied osteoarthritis patients pre and post program the present study revealed that there was improvement in quality of life for osteoarthritis patients post program with highly statistical significance in all quality of life related items ($P < 0.001$). Also the present study illustrated that more than two thirds of patients had low total quality of life compare to after program about two thirds had high total quality of life and more than one third had moderate total quality.

This result was in accordance with **Bindawas, & Binnasser, (2018)** who studied "Effect of knee pain and health-related quality of life among older patients with different knee osteoarthritis severity in Saudi Arabia", and revealed that there was a statistically significant difference between patients total quality of life in all items. Also agreed with **Nahayatbin et al., (2018)** who reported that Tai Chi exercise improved quality of life, sport and recreational activities of osteoarthritis patients. In addition this agreement with **Song et al., (2022)** who reported that The modified Tai Chi exercises are an effective treatment for improved physical function and quality of life of the studied patients.

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The current study found a negative correlation between pre-program implementation and a positive highly statistically significant correlation between the studied osteoarthritis patients' total knowledge, total mastery, total quality of life, and pain score. **Bindawas and Binnasser (2018)** supported this finding by revealing a statistically significant relationship between total knowledge score and patient quality of life. **Cartasa et al., (2018)** found a direct correlation between perceived health-related quality of life and functional capacity in the patients studied.

In addition, **Shahat et al. (2020)** found an inverse relationship between total knowledge and quality of life. This finding is also in agreement with Gad Allah et al., (2019), who explored the "Effect of non-pharmacological nursing guidelines on pain relief among patients with rheumatoid arthritis in Egypt" and discovered a positive correlation between total knowledge and practices before and after the guidelines.

Furthermore, **Shen et al., (2021)** found that "Tai Chi improves brain functional connectivity and plasma Lys phosphatidylcholines in postmenopausal women with knee osteoarthritis." There were also strong correlations between Tai Chi-related pre-post changes in functional connectivity, as well as pain and physical function improvement. Moreover, these studies suggest that regular Tai Chi practice may directly affect the cerebral cortex's ability to control pain and physical function.

Moreover, these findings agree with **Metwaly et al., (2017)**, who examined "the

effectiveness of a non-pharmacological nursing intervention program on female patients with rheumatoid arthritis in Egypt," and revealed that the intervention program improved patients' knowledge, which reflected an improvement in their practice, either in the post or follow-up phases. In addition, the patients demonstrated a high level of independence regarding their ability to perform daily living activities.

Finally the previous findings of the present study are attributed to the importance of intervention program in improving patients' knowledge, mastery, quality of life which raises awareness, improved outcome towards osteoarthritis

Conclusion:

Implementation of a Tai Chi exercise program showed positive impact and effective improvement in knowledge, mastery, and quality of life, raising awareness and improving outcomes among patients with osteoarthritis.

Recommendations:

- Adequate scientific brochure or booklets should be provided for patients with Osteoarthritis in the follow-up and examination clinics, with a simple explanation of the Tai Chi exercise program, and how to practice and apply it.
- Further research: It is recommended that this study be repeated on a larger representative probability sample size in different governorates of Egypt to achieve further generalizability of the results.

References:

Aily G.B and Barton C.J. (2020). A feasibility study on tele-rehabilitation for knee

osteoarthritis in Brazil. *International of Tele-rehabilitation 2* (2020). Pilot Study". *Acta Scientific Orthopaedics 5.5* (2022). 20_26

Shilpi Pal and Manashi Dey (2022). Tele-rehabilitation and its Efficacy in Knee Osteoarthritis - Pilot Study, *Acta Scientific Orthopaedics* (ISSN: 2581-8635) Volume 5 Issue 5 May 2022. DOI: 10.31080/ASOR.2022.05.0454

Kloppenborg M, and Berenbaum F. (2020). Osteoarthritis year in review 2019: epidemiology and therapy. *Osteoarthr Cartil* [Internet]. 2020 Mar; 28(3):242–8. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1063458420300078>

Po-Yin Chen, Chen-Yi Song, Hsin-Yen Yen, Pi-Chu Lin, Su-Ru Chen, Liang-Hsuan Lu, Chen-Li Tien, Xin-Miao Wang & Chueh-Ho Lin, (2021). Impacts of tai chi exercise on functional fitness in community-dwelling older adults with mild degenerative knee osteoarthritis: a randomized controlled clinical trial *BMC Geriatrics*, 21 (449), 110-111.

Do-Youn Lee and Seong-Gil Kim. (2020). The Association between Health-related Quality of Life and Depression on Activity Restriction in Osteoarthritis: A Cross-sectional Study, *J Kor Phys Ther*; 32(6):329-334. <https://doi.org/10.18857/jkpt.2020.32.6.329>

Duray M and Genc A (2017). The relationship between physical fitness and falling risk and fear of falling in community-dwelling elderly people with different physical activity levels. *Turkish journal of medical sciences*; 47(2):455–62.

Zou L, Loprinzi PD, Yu JJ, Yang L, Li C, Yeung AS, Kong Z, Chiou SY, Xiao T (2019). Superior Effects of Modified Chen-Style Tai Chi versus 24-Style Tai Chi on Cognitive Function, Fitness, and Balance Performance in Adults over 55. *Brain Sci.*; 9 (5):102.

Al-Omari B, Hill B. (2020). Nursing people with osteoarthritis. *Br J Nurs*. Oct; 29(18):1060–3.

Zugui Wu , Rui Zhou , Yue Zhu , Ziquan Zeng, Zixuan Ye, Zhenbang Wang, Wengang Liu ,and Xuemeng Xu, (2022). Self-Management for Knee Osteoarthritis: A Systematic Review and Meta-Analysis of Randomized Controlled Trials: (2022): *Hindawi Pain Research and Management* Volume 2022, Article ID 2681240, 19 pages <https://doi.org/10.1155/2022/2681240>

Gheita TA, Eesa NN. (2019). Rheumatology in Egypt: back to the future. *Rheumatology Int*. Jan; 39(1):1–12.

Laucis, Nicholas, C., Ron, D., Hays, and Timothy Bhattacharyya. (2015). "Scoring the SF-36 in orthopaedics: a brief guide." *The Journal of bone and joint surgery*. American volume ;97(19): 1628.

Pearlin, L., & Schooler, C. (1978). The structure of coping. *Journal of health and social behavior*, 2-21.

Akinton.O,Wallis. J, Bunzli.S,&Shields. N, (2017). Practice Guidelines for management of knee osteoarthritis: a systematic review of qualitative studies, *Journal of Nursing Science*, 26(9), P139.

Amin.A,Merza. R, Noori. S & Saeed. A, (2019). Viscosupplementation for Management of Knee Osteoarthritis from an Indian Perspective: An expert consensus report, 17, (9), P30.

Australian Institute of Health and Welfare (2020). Chronic musculoskeletal conditions, Osteoarthritis, AIHW, Australian Government. Web report.

Bindawas. S, and Binnasser. A,(2018). Knee pain and health-related quality of life among older patients with different knee osteoarthritis

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severity, PLoS One peer reviewed, open access Journal, 13(5), P84.

Cartasa,U, Bejaranob. S, Larrartec. J, Morenob. A, and Duchitangab. G., (2018). Perception of quality of life in patients with osteoarthritis, sociodemographic and clinical characteristics. A 5 year study, Association Colombiana de Reumatología, España ;25(3):177–183.

Chang.W, Chen.S, Lee.C, Lin.H, and Lai.P, (2016). The Effects of Tai Chi Chuan on Improving Mind-Body Health for Knee Osteoarthritis Patients: A Systematic Review and Meta-Analysis, Evidence-Based Complementary and Alternative Medicine Volume 2016, Article ID 1813979, 10 pages. <http://dx.doi.org/10.1155/2016/1813979>

Gad Allah W.M, Ragheb M.M, Mahmoud M.H& Mohamed R.F,(2019). Effect of Non Pharmacological Nursing Guidelines on Pain Relief among Patients with Rheumatoid Arthritis; Faculty of Nursing, Benha University Egypt. Available at <https://www.researchgate.net/publication/335684945>.

Hsu.MF, Hsieh.CM and Chiu.AF, (2022). Factors affecting physical activity of people with knee osteoarthritis in Southern Taiwan, A Multiple Logistic Regression Analysis, International Journal of Clinical Practice Volume 2022, Article ID 4736231, 7 pages <https://doi.org/10.1155/2022/4736231>.

Kang. N, Wang. Y, Chen. G, Guo. C, Zhang. Z, Mei d. D, Morrow-Howell.N, and Wang. D, (2022). Functional outcomes of Tai Chi exercise prescription in women with knee osteoarthritis. Sports Medicine and Health Science 4 (2022) 239–244 journal homepage: www.keaipublishing.com/en/journals/sports-medicine-and-health-science/

Mark. H & Ebell, (2018). Osteoarthritis: Rapid Evidence Review, MD, MS, University of Georgia College of Public Health, Athens, Georgia American Family Physician www.aafp.org/afp Volume 97, Number 8,524 – 526.

Masson. O & Krawetz.R, (2020). Understanding cartilage protection in osteoarthritis and injury: a spectrum of possibilities. BMC Musculoskeletal Disorders (2020) 21:432. <https://doi.org/10.1186/s12891-020-03363-6>

Maurice. (2022). Tai Chi Exercises for Seniors: Best Warm-Up, Seated & Balance Tai Chi for the Elderly,available@<http://seniormobility.org/exercises/tai-chi-exercises-foseniors/>,accessed on 10/2021.

McDougall. JJ, Albacete. S, and Schuelert. N. (2017). Lysophosphatidic acid provides a missing link between osteoarthritis and joint neuropathic pain. Osteoarthritis Cartilage; 25:926_34.

Metwaly E.A., Taha N.M., Seliem H.A., & Sakr M.D., (2017). Effectiveness of non-pharmacological nursing intervention program on female patients with rheumatoid arthritis, central European journal of nursing and midwifery; Vol (3): 6%2–631.

Mohsen.M.M, Sabola.N.E, Nagwa I. El-khayat.N.I, Abd El-Salam.E.A, (2021). The effect of nursing intervention on knowledge and practice among elderly with knee osteoarthritis., International Journal of Novel Research in Healthcare and Nursing Vol. 8, Issue 1, pp: (716-726), Available at: www.noveltyjournals.com.

Nahayatbin. M, Ghasemi. M, Rahimi. A, Kalantari. K, Naimi. S, Tabatabaee. S. & Zarein-Dolab. S., (2018). The Effects of routine

physiotherapy alone and in combination with either Tai Chi or closed kinetic Chain exercises on knee osteoarthritis, Tehran, Iran" Iran Red Crescent Med Journal 20(4):e62600.

Ruojin-Li.y , Chen.H, Feng.J, Xiao. Y, Zhang.H, Wai-Kei Lam. C, and Xiao.H, (2020). Effectiveness of traditional Chinese exercise for symptoms of knee osteoarthritis, International Journal of Environmental Research and Public Health, www.mdpi.com/journal/ijerphReceived: 7 October 2020; Accepted: 22 October 2020; Published: 27 October 2020.

Sari. Z, Aydogdu. O, Demirbüken. I, Yurdalan. S, & Polat. M, (2019). A better way to decrease knee swelling in patients with knee osteoarthritis, a single-blind randomised controlled trial. Pain Res. Manag: 8514808. doi: 10.1155/2019/8514808.

.Sharma. L., (2021): Osteoarthritis of the knee. N. Engl. J. Med. 384, 51–59. doi: 10.1056/NEJMcp1903768.

Shahat. MM, Said. A.T, and Ali.R.I, (2020). Effect of nursing guidelines on knowledge and quality of life for patient with knee

osteoarthritis, MD in Medical -Surgical Nursing, Faculty of Nursing-Benha University, Egypt.

Shen CL, Watkins BA, Kahathuduwa C, Chyu MC, Zabet-Moghaddam M, Elmassry MM, et al.,(2021). Tai Chi improves brain functional connectivity and plasma lysophosphatidylcholines in postmenopausal women with knee osteoarthritis: an exploratory pilot study. Front Med (Lausanne). 2021;8:775344.

Song.J, Wei.L, Cheng.K, Lin.Q, Xia.P, Wang.X, Yang.T, Chen.B, Ding.A, Sun.M, and Chen.A, (2022). The effect of modified Tai Chi exercises on the physical function and quality of life in elderly women with knee osteoarthritis, China. Frontiers in Aging Neuroscience, Volume 14, Article 860762, www.frontiersin.org.

Zheng. H, Zhang. D, Zhu. Y, Wang. Q, (2021). Effect of Tai Chi exercise on lower limb function and balance ability in patients with knee osteoarthritis A protocol of a randomized controlled trial, Zheng et al. Medicine (2021) 100:46 Medicine.

تأثير برنامج تمارين تاي تشي على نوعية الحياة لمرضى التهاب المفاصل

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يعتبر التهاب المفاصل احد الأمراض المزمنة الأكثر شيوعا التي يمكن أن تؤدي إلى فقدان نوعية الحياة. تاي تشي هو شكل شائع من التمارين بين كبار السن ، ويشمل التوازن والتمارين الرياضية والمرونة وتمارين تحمل الوزن مع التأمل والتنفس العميق. لذا هدفت هذه الدراسة إلى تقييم تأثير برنامج تمارين تاي تشي على نوعية الحياة لمرضى التهاب المفاصل. وقد اجريت هذه الدراسة في العيادة الخارجية للعظام للمرضى في مستشفى بنها الجامعي من بداية ديسمبر 2021 إلى نهاية مارس 2022 على عينة غرضية من 86 مريضا بالتهاب المفاصل. حيث اسفرت نتائج الدراسة عن وجود تحسن في متوسط الانحراف المعياري لمعلومات المرضى بعد تطبيق البرنامج مقارنة بما قبل البرنامج. وكانت هناك فروق ذات دلالة إحصائية عالية فيما يتعلق بجميع عناصر المعلومات بين قبل وبعد تنفيذ البرنامج ($P < 0.001$). كما كان هناك تحسن ذو دلالة إحصائية عالية في جودة الحياة لمرضى التهاب المفاصل بعد برنامج تمارين تاي تشي. وان حوالي 65.1% من مرضى التهاب المفاصل الذين تمت دراستهم لديهم تمكن إجمالي منخفض على التهاب المفاصل قبل البرنامج والتي انخفضت إلى 7% بعد تنفيذ البرنامج. في حين تم العثور على تمكن إجمالي مرتفع على التهاب المفاصل بنسبة 3.5% من المرضى الذين شملتهم الدراسة والتي زادت بعد البرنامج إلى 43.0%. كما أوصت الدراسة بتوفير برشور أو كتيبات علمية كافية لمرضى التهاب المفاصل في عيادات العظام، مع شرح مبسط لبرنامج تمارين تاي تشي.