Advanced International Journal of Multidisciplinary Research
E-ISSN: 2584-0487 editor@aijmr.com
Volume 2, Issue 3, May - June 2024
CrossRef DOI: 10.62127/aijmr.2024.v02i03.1043

Effectiveness of Mindfulness Based Cognitive Therapy Verses Conventional Physiotherapy on Kinesiophobia in Patients with Frozen Shoulder: A Comparative Study

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Abstract

Background: Frozen Shoulder is defined as a clinical syndrome characterized by painful restriction of both active and passive shoulder movements (1) . there is high degree of kinesiophobia among patients having shoulder pain(2). Mindfulness based cognitive therapy (MBCT) may be an effective intervention for the treatment of active depression in a population with chronic pain (3) . The treatment goal of MBCT program, is to find ways of managing the pain and the adverse consequences on mental health and quality of life (4). considering that in patients with frozen shoulder treatment of pain alone was not enough to reduce fear of movement , Hence this study aimed to find the effect of MBCT on pain and kinesiophobia in patients with frozen shoulder.

Objective: To find the effect of mindfulness based cognitive therapy on pain and kinesiophobia in patients with frozen shoulder.

Methodology: After designing the study Institutional Ethical Approval was taken. Consent was obtained from all the participants. 30 samples were screened based on eligibility criteria, 2 were excluded and 28 were further divided into Group A (experimental group) received MBCT and conventional therapy and Group B (control group) received conventional therapy. Pre-assessment was by Tampa scale for kinesiophobia and VAS scale for pain done at Week 0. The experimental group received the MBCT and regular exercise program for 8 sessions 2 hours per day for 8 weeks. The control group received regular exercise program. Post-assessment was done at week 8.

Result: The (INSTAT) was used for comparison of mean of group A and group B. One participant from the experimental group and one from the control group did not complete the study. The comparison of mean post intervention scores for group A and B of TSK Scores was found to be Extremely significant which was calculated using un-paired t test with t value t= 3.922, p value p= <0.0006.

Comparison of mean post intervention scores for group A and B of VAS Scores was found to be Not significant which was calculated using un-paired t test with t value t= 0.4583, p value p= 0.6505.

Conclusion: The study concludes that MBCT along with conventional physiotherapy is effective in reducing kinesiophobia in patients with frozen shoulder.

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Keywords: kinesiophobia, pain, mindfulness based cognitive therapy, frozen shoulder

Introduction:

Frozen Shoulder is defined as a clinical syndrome characterized by painful restriction of both active and passive shoulder movements .(1)

The incidence of' frozen shoulder in the general population has been reported to be 2-5 %, while among individuals with Diabetes it is 10-20 % (5).

The word kinesiophobia was introduced in 1990 by Kori, Miller, and Todd. Kinesiophobia is a condition in which a patient has ‘‘an increased, irrational, and enfeebling fear of physical movement and activity resulting from a feeling of vulnerability to painful injury or reinjury’. there is high degree of kinesiophobia among patients having shoulder pain.

Kinesiophobia could thus be one reason why older adults with chronic pain restrict their level of physical activity. As previously discussed, a consequence of chronic pain according to the fear-avoidance model can be limited physical activity that may lead to a cycle of more pain restriction, decreased participation, and disability[6].

MBCT is a assuring intervention for individuals searching treatment in primary health care settings who are experiencing increased levels of psychological distress in the circumstances of chronic illness and/or other stressful health-related challenges (7) .

Important mechanism of action of MBCT may be to enhance the ability to intentionally redistribute one’s attention, allowing for more flexible cognitive and behavioral responses (8).

While MBCT places less emphasis on changing or disputing particular cognitions, it does encourage patients to embrace a new way of being and relating to their ideas and feelings (8).

studies have demonstrated that patients with diabetes, cancer, epilepsy, and chronic pain who include MBCT in their treatment regimens may have improvements in their overall health(9).

Mindfulness therapy can help patients overcome their fear of moving, lower their anxiety and sadness, get better sleep, and advance their psychological well-being(10).

According to research, individuals in mindfulness therapy may experience plastic changes in the structure and function of brain regions that control their attention, emotions, and self-awareness. Additionally, it may enhance emotional regulation through strengthening cognitive reappraisal skills and by lessening the negative aspects of psychological distress, such as anxiety, depression, and pain. Mindfulness therapy has been shown to enhance pain management, focus, sleep quality, and overall well-being(10). As it relates to mental health promotion, mindfulness treatment had shown to have significant positive impacts on psychological adjustment and healing(10).

Considering that in patients with Frozen shoulder, treatment of pain alone is not enough to reduce fear of movement, approaches towards other treatment strategies along with the existing treatment methods for frozen shoulder to overcome this fear should be discovered and included in the treatment program.

2. MATERIALS AND METHODS

2.1 Design

convenient sampling was done to obtain study participants and eligible participants were randomly divided. All participants were explained purpose of the study and informed about nature of study and

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about research procedure. written informed consent and demographic data was obtained from all the participants. The study had begun after the Ethical Clearance from the Institutional ethical committee. The IEC no was Dr.APJAKCOPT/BPT/UG/2023/17.

2.2 Study Setting

It was in the department of Orthopedic physiotherapy in Dr, A.P.J. Abdul kalam college of Physiotherapy, PIMS (DU) loni ,Ahmednagar district Maharashtra, India.

2.3 Study Duration

Aug 2023 to Feb 2024.

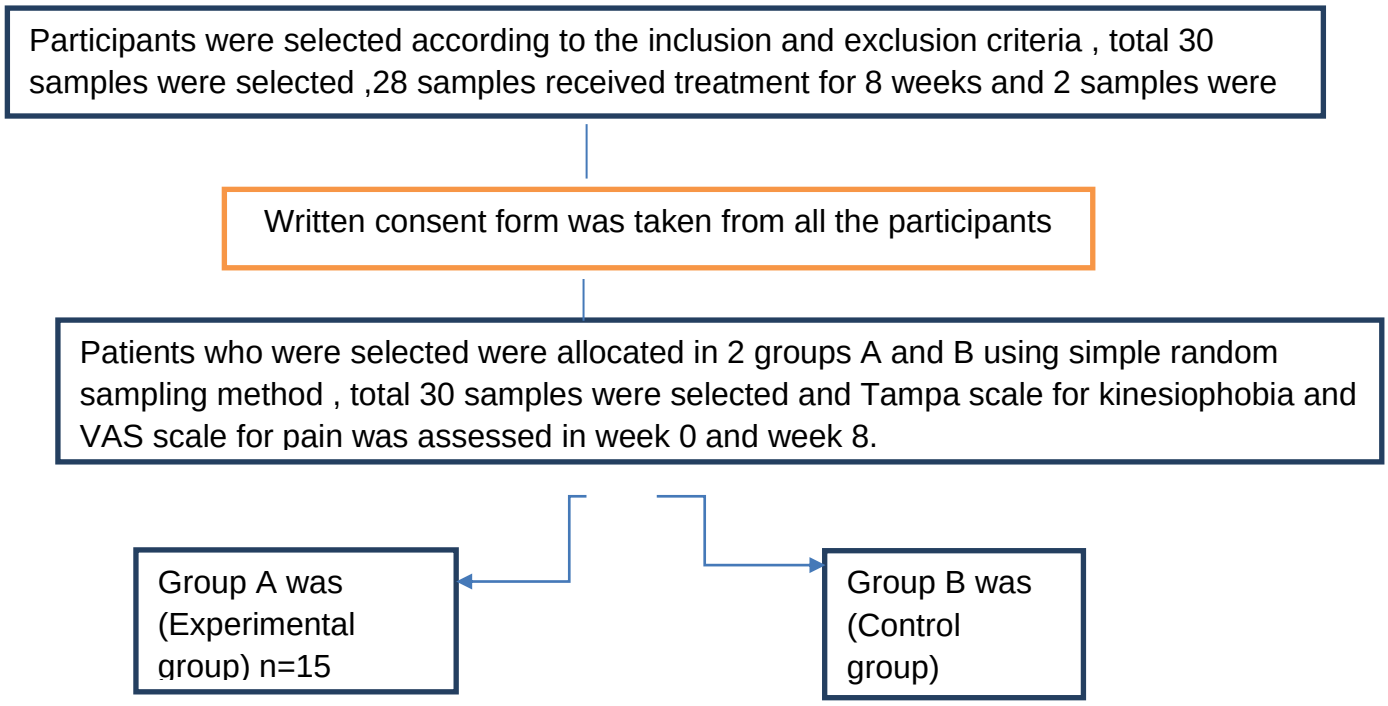
2.4 Sample size calculation

Sample size was calculated using **open Epi software**, with the above-mentioned assumptions, the sample size needed for this study was 30 participants. total 30 samples were selected , A total of 28 samples received treatment for eight weeks and 2 samples were drop out. participants were divided into2.

2.5 Participant recruitment

Participants with Age between-40-60 years, both male and female with traumatic and non traumatic with stageI and stageII frozen shoulder , participants who had given informed consent. patients committed and motivated to undertake MBCT program, the tampa scale of kinesiophobia in which the scores above 38 were considered to have positive kinesiophobia included in the study. Patient with additional injuries with frozen shoulder, any psychiatric disease, any neurological deficit were excluded from the study.

Figure 1: Design and flow of participants through the trial



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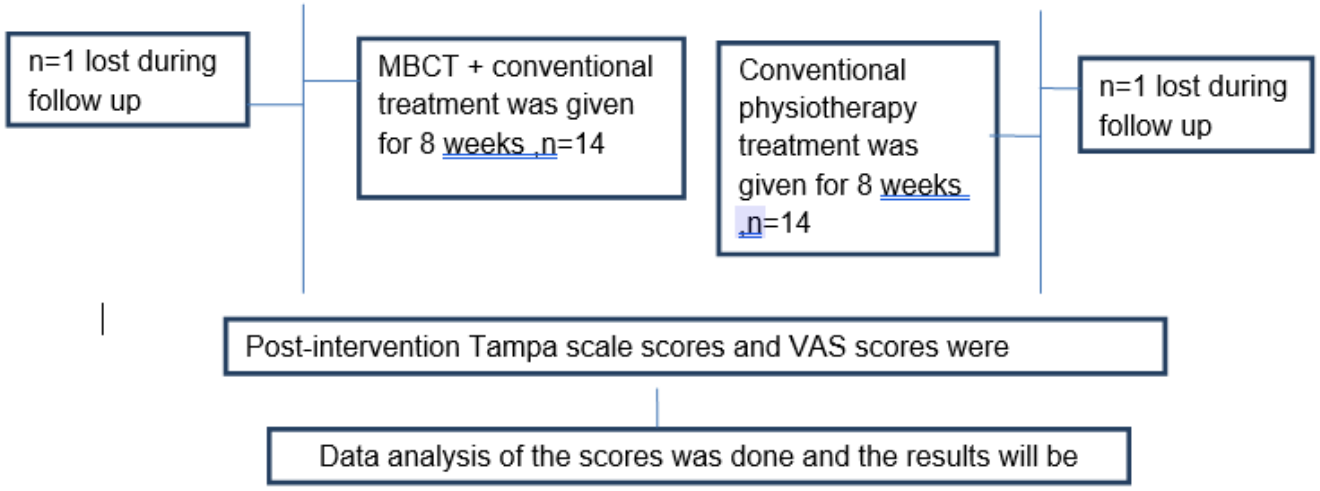

2.6 Procedure

Participants were allocated in two different group by convenient sampling method. All the patients were assessed for the levels of kinesiophobia with the help of Tampa scale of kinesiophobia (TSK) and the score was calculated those patients who had a final TSK score of 38 or above were included in the study patients were also assessed for pain with help of VAS. The selected subjects then were randomly divided into two groups. Group A (MBCT) and Group B (Conventional therapy). All the participants in group A were given mindfulness based cognitive therapy along with conventional physiotherapy, Simultaneously all the participants in group B were given conventional physiotherapy for 8 weeks. After 8 weeks of this intervention all the participants were re-assessed using the TSK scale and VAS their scores were noted and compared to those taken pre-intervention.

2.7 Outcome measures

2.7.1 For kinesiophobia :Tampa Scale 11

Tampa Scale for kinesiophobia (TSK): The term "kinesiophobia" describes the maladaptive pain-related fear that was linked to avoidance behaviors, such as avoiding physical exertion and movement.The TSK is a 17-item assessment tool used to measure movement-related injury fear. For example, patients are asked to rate how much they agree with the following 17 statements: "Pain lets me know when to stop exercising so that I don't injure myself." From 1 (strongly disagree) to 4 (strongly agree), ratings are given. Higher numbers indicate a high level of pain-related fear. The responses were added together to create a total score[9].

2.7.2 For Pain Intensity: visual Analog Scale(VAS)

Pain Visual Analogue Scale (VAS):By asking participants to score their pain on a Visual Analogue Scale (VAS) throughout the course of the previous month, clinical pain severity was self-reported by the participants. The words "no pain" on the left and "the most intense pain imaginable" on the right serve as the anchors for the 100 mm-long scale. When compared to other pain measurement techniques, the visual analog scale (VAS) had shown strong concurrent validity and reliability in a number of studies measuring patients pain levels[9].

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2.8 Statistical analysis

Analyses were conducted using instat software. The mean between-group difference between the experimental and control groups were calculated with paired and unpaired t-test.

***VAS scale:**

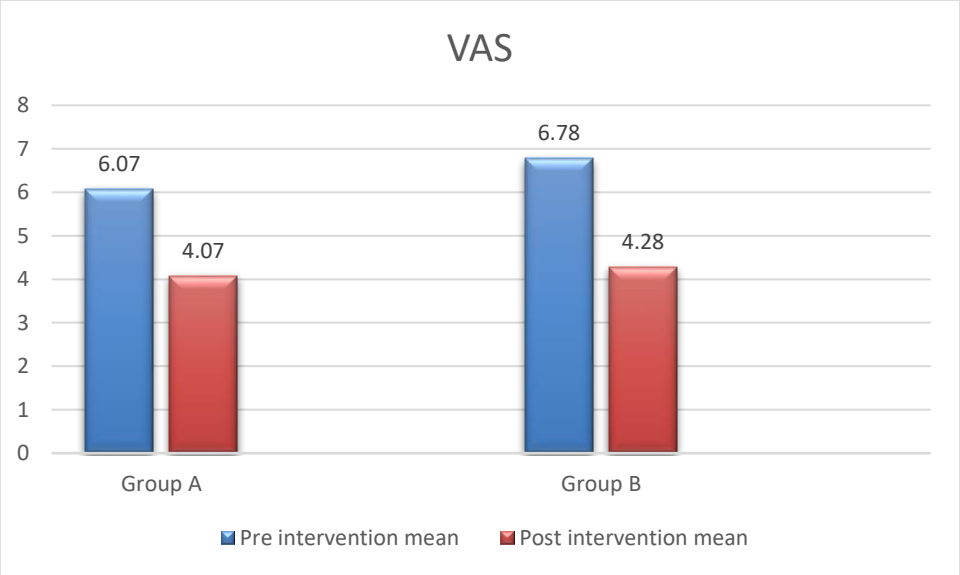
Comparison of pre-intervention and post-intervention VAS scores in Group A:-

VAS scale was used as an outcome measure for assessment of pain in patients with frozen shoulder. The mean of pre- intervention VAS scores of group A was 6.07 ± 1.43 and the mean of post intervention VAS scores of group A 4.07 ± 0.99 was the comparison of mean pre and post intervention, calculated using paired t test shows that the study is Extremely significant with t value 9.859 and p value is <0.0001.

Comparison of pre-intervention and post-intervention VAS scores in Group B:-

VAS scale was used as an outcome measure for assessment of pain in patients with frozen shoulder. The mean of pre- intervention VAS scores of group B 6.78 ± 1.47and the mean of post intervention VAS scores of group B 4.28 ± 1.43 was the comparison of mean pre and post intervention, calculated using paired t test shows that the study is Extremely significant with t value 9.179 and p value was <0.0001.

VAS	Pre intervention mean	Post intervention mean
Group A	6.07	4.07
Group B	6.78	4.28



Comparison of post-intervention VAS scores in group A and post-intervention VAS scores in Group B:-

VAS scale was used as an outcome measure for assessment of pain in patients with frozen shoulder. The mean of post-intervention VAS scores of group A 4.07 ± 0.99 and the mean of post intervention VAS scores of group B 4.28 ± 1.43 was the comparison of mean pre and post intervention, calculated using unpaired t test shows that the study was Not significant with t value 0.4583 and p value was < 0.6505.

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***Tampa scale:**

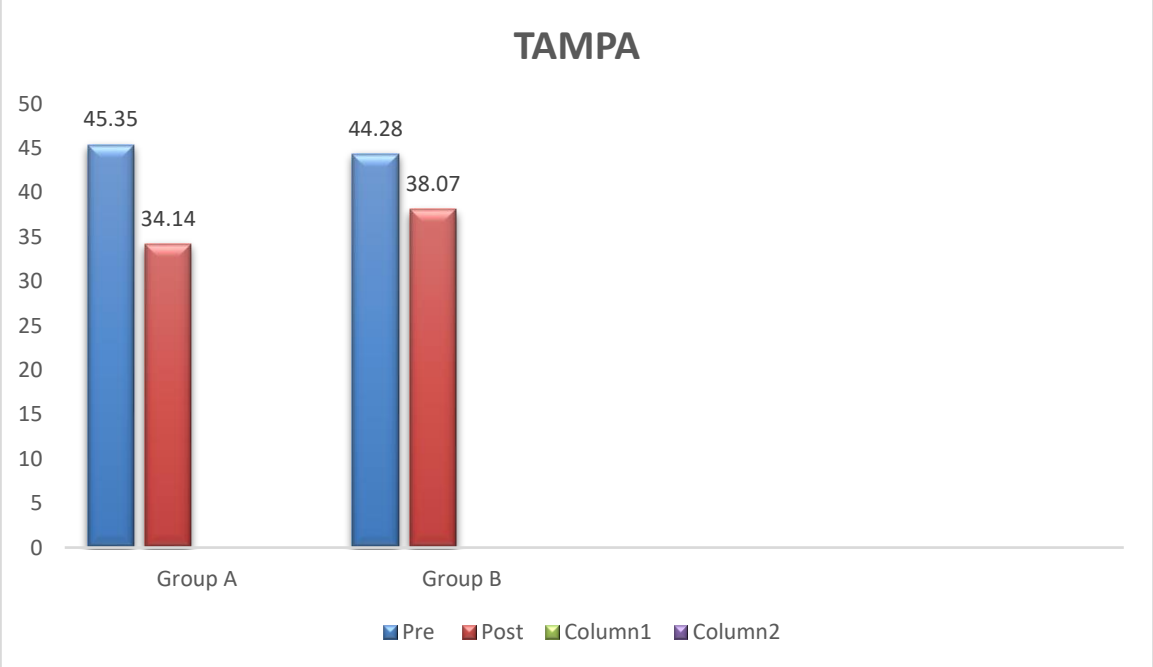
Comparison of pre-intervention and post-intervention TSK scores in Group A:-

Tampa scale for kinesiophobia was used as an outcome measure for assessment of the levels of kinesiophobia in patients with frozen shoulder. The mean of pre- intervention TSK scores of group A was 45.35 ± 3.47 and the mean of post intervention TSK scores of group A is 34.14 ± 2.62 the comparison of mean pre and post intervention, calculated using paired t test shows that the study was Extremely significant with t value 18.037 and p value is <0.0001 .

Comparison of pre-intervention and post-intervention TSK scores in Group B:-

Tampa scale for kinesiophobia was used as an outcome measure for assessment of the levels of kinesiophobia in patients with frozen shoulder. The mean of pre- intervention TSK scores of group B was 44.28 ± 2.89 and the mean of post intervention TSK scores of group B was 38.07 ± 2.67 the comparison of mean pre and post intervention, calculated using paired t test shows that the study was Extremely significant with t value 11.586 and p value is <0.0001 .

TSK	Pre intervention mean	Post intervention mean
Group A	45.35	44.28
Group B	34.14	38.07



Comparison of post-intervention TSK scores in group A and post-intervention TSK scores in Group B:-

Tampa scale for kinesiophobia was used as an outcome measure for assessment of the levels of kinesiophobia in patients with frozen shoulder. The mean of Post - intervention TSK scores of group A was 34.14 ± 2.62 and the mean of post intervention TSK scores of group B was 38.07 ± 2.67 the comparison of mean pre and post intervention, calculated using unpaired t test shows that the study was Extremely significant with t value 3.922 and p value was <0.0006.

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3. RESULTS

Table 1: Demographic and physical characteristics of participants at the baseline are shown in Table 1

Demographics	Group A	Group B
Gender	M=10,F=5	M=9,F=6
Age, mean (SD)	52.13(6.04)	53.2(4.69)

Gender : There were 5 females and 10 males in group A and 6 females and 9 males in group B. There were 19 males and 11 females in Mindfulness based cognitive therapy and Conventional therapy. Theduration of the treatment was for 8 weeks.

Age : The average age of group A was 52.13 ± 6.04 years and the average of group B was 53.2 ±4.69 years. The total mean of 28 participants was 52.13 ±53.2 years.

Table 2: Content and progression of the experimental group intervention (Group A) In the i.e. the intervention group, MBCT technique was added to study its effect. MBCT sessions were given immediately after the conventional exercises. Group A:(MBCT with conventional therapy) [11]

Excercise	**Practices in session:**	**Exercises in session:**	**Home practice:**
WEEK1: Awareness and automatic pilot	1.Rasin exercises 2.Body scan meditation	Group forming-setting up the course; participants introducing themselves	45-min body scan meditation Informal practice bringing attention to routine activities [11]
WEEK 2: Living in our heads	1.Body scan meditation 2.10 minutes of mindful breathing	Thoughts and feelings exercise body scan meditation	10 minutes mindfulness of breathing bringing attention to daily routine activities ,keep a daily record of pleasant experiences [11]
WEEK 3:Gathering the scattered mind	1.Mindful movement 2.Stretch and breath practice 3.3-minute breathing space	Exploration of pleasant experiences calender[11]	Stretch and breath practice on days 1,3,5 mindful movement practice on day 2,4,6 keep a daily record of unpleasant experiences 3-minute breathing space practiced at 3 pre-decided times daily [11]
WEEK 4: Recognizing aversion	5 minute mindfulness of	exploration of unpleasant	sitting meditation 3-minute breathing

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	seeing sitting meditation 3 minute breathing space (as responsive practice) mindful walking .	experiences calender defining and exploring the territory of kinesiophobia.	space(regular) 3 times a day 3-minute breathing space (responsive) whenever you notice unpleasant feelings[11]
WEEK 5: Allowing / letting be	Sitting meditation (emphasizing on how we react to what ever thoughts and body sensations arise) 3-minute breathing space	Exploring habitual patterns of reaction and potential use of mindfulness skills to facilitate greater responsiveness to present moment experience	sitting meditation 3-minute breathing space(regular) 3 times a day 3-minute breathing space (responsive) whenever you notice unpleasant feelings[11]
WEEK 6: Thoughts are not facts	Sitting meditation 3-Minute breathing space	mood thoughts and alternative viewpoint exercise	practicing 40 minutes per day with different combination of 3 core practices 3-Minute breathing space(regular) 3 times a day 3-Minute breathing space (responsive) whenever you notice unpleasant feelings[11]
WEEK 7: How can I best take care of myself?	Sitting meditation (noticing how we relate to experiences through the reactions we have) 3-Minute breathing space[11]	Exploration of links between activity and mood identifying relapse signatures and actions to deal with threat of relapse	Breathing space (regular and responsive)
WEEK 8: Maintaining and extending new learning	Body scan meditation	Review of whole course review and discuss relapse action plans	Plan for home practice that participant can sustain for next month.

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Table 3: Conventional group exercise

Conventional treatment	
Pendulum stretch 10 revolutions in each direction once a day.	Total 5 sessions 1 hours per day and mini 5 days a week [12]
Towel stretch 10 to 20 times each day. Finger walk 10 to 20 times a day	Total 5 sessions 1 hours per day and mini 5 days a week [12]
Cross-body reach Hold the stretch for 15 to 20 seconds.	Total 5 sessions 1 hours per day and mini 5 days a week [12]
Armpit stretch 3 to 4 times each day.	Total 5 sessions 1 hours per day and mini 5 days a week [12]

Table 4: Mean (SD) of groups Within groups

VAS	Pre	Post
Group A mean(SD)	6.07(1.43)	4.07(0.99)
Group B mean(SD)	6.78(1.47)	4.28(1.43)
Tampa	Pre	Post
Group A mean(SD)	45.35(3.47)	34.14(2.62)
Group B mean(SD)	44.28(2.89)	38.07(2.67)

Between Groups

VAS	Group A mean(SD)	Group B mean(SD)
Post	4.07(0.99)	4.28(1.43)
Tampa	Group A mean(SD)	Group B mean(SD)
Post	34.14(2.62)	38.07(2.67)

4. DISCUSSION

The current study was aimed to compare the effectiveness of mindfulness based cognitive therapy versus conventional physiotherapy on kinesiophobia in patients with frozen shoulder.One phenomenon that fits into the framework of a fear-avoidance theory was fear of mobility. The idea was that pain experiences trigger fears, which trigger avoidance behaviors, including avoiding things that require physical activity when going out daily, exercising, or working. Three main components of these theories are fear: dread of pain, fear of movement/fear of injuring again, and fear-avoidance behaviors[13].

Avoidance Model and nonconstructive coping with pain both contend that avoidance of activities and behaviors associated with rehabilitation and health results from one's experience of pain. Broadly

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speaking, one can say that they begin to close themselves in the "pain bubble" and a completely new way of thinking about themselves, as a person who is not fully functional, while experiencing a lot of unpleasant emotions in the form of anxiety, sadness, grief and guilt[14].

According to a study by Emily L. et al. on the fear-avoidance model of chronic pain and pain-related fear impairment, researchers have started to modify cognitive behavioral therapies for anxiety and fear to treat pain-related fear. Additionally, exposure-based plans of action, which involve teaching adaptive coping mechanisms and exposing patients to situations or items they dread, are regarded as the gold standard therapies for a number of phobias (i.e., fear triggered by anticipation of an object or situation) [15].

In current study, the group A was given MBCT technique along with conventional physiotherapy. After comparing the pre and post intervention scores of group A of outcome measure TSK scale the patients showed reduced levels of kinesiophobia after undergoing MBCT along with conventional treatment. After comparing the pre and post intervention scores of group A and group B of outcome measure VAS scale the patients showed reduced levels of pain after undergoing MBCT along with conventional treatment and conventional treatment alone .

The intervention's underlying theories focused on developing the capacity to refocus or distance oneself from a ruminative cognitive process. Participants in the MBCT acquire the ability to connect experience features in general and ruminative thought patterns in particular from a de-centered perspective. Developing the ability to not be identified or lost inside experience—for example, by viewing thoughts as thoughts rather than representations of reality—is a key component of decreasing. Parallel findings were found in a study by Abdolghaderi M et al. titled Effectiveness of Mindfulness-Based Cognitive Therapy (MBCT) and Cognitive Behavioral Therapy (CBT) in Reducing Pain, Depression, and Anxiety in Patients with Chronic Low Back Pain. The study indicated that MBCT and CBT were highly helpful in reducing pain, depression, and anxiety[16].

In current study Group B was given conventional physiotherapy exercises which also showed reduced levels of kinesiophobia after comparing pre and post- intervention scores of group B assessed with the help of TSK scale.

In current study comparison of the effectiveness of mindfulness based cognitive therapy versus conventional physiotherapy on kinesiophobia in patients with frozen shoulder was done which statistically showed that MBCT combined with conventional physiotherapy was more effective in treating kinesiophobia with (t- 3.922).

Patients with shoulder issues often have psychosocial characteristics that may contribute to the disease, the patient's experience of pain and disability, and the patient's functional result following surgery.The persistent nature of the symptoms frequently had a detrimental effect on one's physical and mental health as well as quality of life. Higher degrees of pain and impairment in upper extremity disorders can be linked to kinesiophobia, negative pain belief, low pain efficacy, and catastrophizing[17]. More specifically, depression and anxiety are linked to higher degrees of functional impairment and longer symptom duration in patients with shoulder issues, and they can have a detrimental impact on health-related quality of life. A previous study concentrated on individuals with frozen shoulder, a debilitating shoulder ailment marked by functional restriction of both active and passive shoulder motion and frequently excruciating pain for which glenohumeral joint radiographs were essentially normal. While a

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small percentage of individuals with frozen shoulder recovered on their own without any help, most patients still experienced pain and/or limited movement. Abrassart et al. also made similar observations. These authors came to the conclusion that while there was a good probability of continued low-level limitation and pain, the natural course of frozen shoulder frequently shows short-term recovery[17]. A 2017 meta-analysis of 547 individuals found that mindfulness-based therapies can reduce symptoms of anxiety and depression by 30–60% while also lowering the overall stress level of patients[11].

Comparing the post interventional TSK scores of both the groups, the study proved that both the interventions were statistically significant in reducing TSK scores and were effective in reducing levels of kinesiophobia but Group A participants showed more effective results in reducing the levels of kinesiophobia compared to group B.

Comparing the post interventional VAS scores of both the groups, the study proved that both the interventions were statistically significant in reducing VAS scores and were effective in reducing levels of pain but Group A participants showed more effective results in reducing the levels of pain compared to group B as group A. participants received both the conventional and MBCT treatment the participants showed greater reduction in the levels of kinesiophobia. Thus we conclude that along with the conventional physiotherapy interventions for frozen shoulder, Mindfulness based cognitive therapy should also be taken into consideration in order to reduce the levels of kinesiophobia and improve quality of life in such patients.

5. Conclusion

Based on the scores obtained using the Tampa Scale for Kinesiophobia (TSK), we determined that mindfulness-based cognitive therapy given along with conventional physiotherapy for 8 weeks was more effective than just conventional therapy alone in lowering the levels of kinesiophobia in patients with frozen shoulder. For these individuals, MBCT should therefore be administered in addition to conventional treatment.

Implication

We recommend that MBCT can be introduced along with conventional physiotherapy to treat patients with frozen shoulder who have increased levels of kinesiophobia.

Limitation:

1. The study did not include patients who were with additional injuries with frozen shoulder.
2. sAs the study was time bound the sample size was small.

Future scope

1. Further studies involving the said intervention of MBCT can be successfully carried out in individuals with additional injuries with frozen shoulder
2. Effect of MBCT can also be studied in Patients who have similar other conditions that show signs of chronic pain.

Funding: None

Disclosure of Interest: The Authors declares that they have no competing interest.

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