

EFFECTIVENESS OF COGNITIVE BEHAVIORAL THERAPY ON PAIN, MOBILITY AND DISABILITY IN PATIENTS WITH OSTEOARTHRITIS GRADE I

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ABSTRACT

Background: The method which can help to manage problem by modifying thinking behavior and ways among patients is termed as cognitive behavioral therapy. Primarily, it does not remove the problem but help in managing the problems in positive way. It was first introduced as ago as 1950, however, was lacking research-based evidence on it.

Objective: The objective of this study was to determine effectiveness of cognitive behavioral therapy on pain, mobility and disability in patients with osteoarthritis.

Methods: This was randomized clinical trial conducted on 50 patients, 25 in each of cognitive behavior group and control group. The outcome such as symptoms, mobility, stiffness, function and quality of life were measured by Knee Injury and Osteoarthritis Outcome Scale. The data was analyzed by Statistical Package for Social Sciences (20.0). The demographics were analyzed as Number distribution for categorical variables and mean/ standard deviation for continuous variables. Independent samples t test was used to compare mean of test variables at before and after treatment.

Results: Main results showed a significant better measure for patients taking cognitive behavior therapy with routine for knee osteoarthritis such as shown by mean difference and p value as walk time 3.52 minutes (p value 0.008), symptoms 2.12 (p value 0.000), stiffness 0.88 (p value 0.000), pain 4.04 (p value 0.000), functions 7.400 (0.000), sports 1.04 (0.056), quality of life 1.12 (0.04) and KOOS percentage 9.87 (0.000).

Conclusion: The study concluded that cognitive behavior therapy had remarkable role in improving pain, mobility and disability in patients with osteoarthritis when combined with routine physical therapy.

Keywords: Cognitive Behavioral Therapy, Osteoarthritis, Physical Therapy, Knee Joint

1 INTRODUCTION

The method which can help to manage problem by modifying thinking behavior and ways among patients is termed as cognitive behavioral therapy. Primarily, it does not remove the problem but help in managing the problems in positive way. It was first introduced as ago as 1950, however, was lacking a research-based evidence on it.(Lee and Park, 2019)

Behavior therapy was first developed independently in three countries namely England, USA and South Africa. It was then introduced by Dr. Aron Beck in 1970s for its main application in anxiety, eating and depression disorders. The evidence was lacking on cognitive behavioral therapy, so, in early stages of application behavioral therapy and cognitive therapy had been merged to its use in clinical practice. (Kashikar-Zuck et al., 2018)

So combined cognitive behavior therapy was developed to improve coping skills against pain. This may provide an effective method to decrease disability and pain in patients of osteoarthritis. Controlled trials on coping skills have suggested that this training may give a way to improve pain and function in patients suffering from continuous pain issues such as joint pain and low backache. Other problem studied under this regime included rheumatoid arthritis and chronic pain complaints. (Falck et al., 2018, Ismail et al., 2017, Murphy et al., 2018)

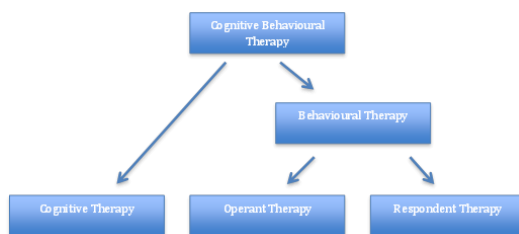


Figure 1 Cognitive Behavior Therapy Theory Elements

Osteoarthritis is among common degenerative diseases. Studies of epidemiology show around of 40 to 70 percent of elderly population suffer from this problem worldwide. Individuals with osteoarthritis commonly complain about pain. Medical therapy is usually directed for relieve

of pain in osteoarthritis. Surgical and medical therapies have many limitations for cure of osteoarthritis conditions.(Lu et al., 2019)

Aspirin and various nonsteroidal anti inflammatory drugs are usually used for symptoms relief, however, there is no evidence about that NSAIDS slow down the course of degenerative disease. Animal studies indicate that chronic use of these drugs further disrupt degenerative process and also injurious to other systems such as gastrointestinal system itself. Moreover, aspirin and other NSAIDS cause further hazards to elderly populations for the fact that they may interact with medications being used for other organs such as gastric mucosa or renal blood flow. Transient improvement may be obtained by injecting steroids into osteoarthritic joints to reduce swelling and pain. (Hall et al., 2018, Falck et al., 2018)

When steroids are injected too often, they can catalyze the osteoarthritis by reducing synthesis of matrix and creating fissures in cartilage. At end, surgical treatment may be helpful for some patients, but, overall it is reserved for the patients who cannot tolerate pain or functionally become severely disable and do not respond to conservative treatments.(O'moore et al., 2018, Park and Chang, 2016)

In a situation where prevalence of osteoarthritis is increasing and there are many limitations of medical therapies, there is clear indication to explore more approaches for management of osteoarthritic pain. Cognitive behavioral therapy is introduced to induce better skills for coping pain and disability resulting from osteoarthritis. Clinical controlled trials suggest that training of coping skills is helpful in reducing disability and pain in patients suffering from continuous pain such as low back pain, heterogenous pain issues, and pain resulting from rheumatoid arthritis. (Falck et al., 2018, Ismail et al., 2017, Murphy et al., 2018)

The factor such as Pain Control and Rational Thinking was found to be associated with lesser pain levels. Patients having high scores on PCRT were rating their coping skills highly effective and they were found to be avoiding irrational and catastrophizing ways. PCRT factor was found to be a stronger predictor of psychological and physical disability as compared to those of medical predictors such as x-ray findings and body mass index. Parker and co-authors recently detected the same CSQ factors in a sample of 79 patients with rheumatoid arthritis and concluded that PCRT factor was related to pain psychological status despite of controlling disease severity and demographics. Pain coping skill training is potentially very useful in managing osteoarthritis, there is less literature in clinical trials studying the effects of these as an intervention. For adequately evaluating the effects of training regarding pain coping skills, it needs to be compared with arthritic education and standard care protocol for this condition. Because educational treatments developed to provide with information regarding treatment and its nature forms a good comparison. Arthritic education is employed widely in the management of arthritic patients such as coping skill training used in multiple sessions. Specialists of arthritic education have already started incorporating some of the principles being used in cognitive coping skills in their intervention. In this regard, clinical trials have not been conducted to compare the effects of pain coping skills in systematic pain and that of musculoskeletal or arthritic pains. (Birch et al., 2017, Foo et al., 2017, Okajima and Inoue, 2018, Salwen et al., 2017)

Studying osteoarthritis is important especially due to its increasingly large prevalence and incidence with increasing age and degenerative changes in the knee joint and cartilage. (Birch et al., 2017, Murphy et al., 2018, O'moore et al., 2018, Patel et al., 2018, Smith et al., 2015)

2 OBJECTIVE

The objective of this study was to determine effects of cognitive behavioral therapy on pain, mobility and disability in patients with osteoarthritis.

3 RATIONALE

Osteoarthritis is among the most common degenerative conditions. Because it affects joints, so mobility and disability are main impairments that result due to its pain. There are many treatment methods to improve these impairments. However, due to their chronic nature brain adopts its pain and fear that it will no longer recover. Cognitive behavioral therapy is a way that counsel's patients about their effects. This may not only help patient's awareness about osteoarthritis, but may also improve their skill to cope these impairments and actually impacts on cognition that they are improving. If proven its effectiveness, this may prove best adjunct therapy for improving osteoarthritis impairments and may help community at large. (Thorn, 2017)

4 HYPOTHESIS

5 ALTERNATIVE HYPOTHESIS, H₁

There is significant effect of cognitive behavioral therapy on pain, mobility and disability in patients with osteoarthritis grade I.

6 **NULL HYPOTHESIS, H₀**

There is no significant effect of cognitive behavioral therapy on pain, mobility and disability in patients with osteoarthritis grade I.

7 **MATERIALS AND METHODS**

8 **STUDY DESIGN**

It was Randomized Clinical Trial

9 **PATIENT SELECTION**

Sampling Technique

Consecutive sampling was used as sampling technique.

Sample Size

50 Patients were taken.

Patient Recruitment and Study Settings

Patients was recruited through word of mouth invitation, flyers explaining symptoms of knee osteoarthritis. These patients were further screened for inclusion in the study based on set criteria. Patients were invited for treatment at Department of Physical Therapy, Fatima Memorial Hospital, Lahore

10 **STUDY DURATION**

Study was completed in six months after permission granted for data collection.

11 ELIGIBILITY CRITERIA

Following inclusion and exclusion criteria used for patient selection were as follows.

Inclusion Criteria:

- Male and Female older adults
- Age 45-75 years
- Persistent pain from least of 5 years
- The patients diagnosed on the basis of The Kellgren-Lawrence radiographic grading criteria and ACR Clinical classification criteria.(Kohn et al., 2016, Salehi-Abari, 2016)

Exclusion Criteria:

- Patients with arthritic disorders other than osteoarthritis
- Known disease of organic nature significantly affecting function
- Any cardiopulmonary disorders interfere with activity

12 STUDY GROUPS

Subjects was equally distributed to two groups

Group 1, Cognitive Behavior Therapy Group

This group was session of cognitive behavioral therapy. Although all following elements was not be applicable but these are the outlines around which treatment plan was working.

- Establishing rapport and providing reassurance
- Reviewing list of problems and identifying area of distress.
- Providing psychoeducation regarding problems and treatment
- Providing general headings for process of therapy

- Emphasizing significance of self-monitoring and routine of practice at home.
- Inviting members of family to one session when applicable and eliciting reactions during sessions.
- Addressing issues regarding non-completion of home assignments and instructing patients regarding methods for thought controlling and control of stimulus, also helping patient regarding worry time schedule
- Reviewing homework such as relaxation methods, mood tracking, problem solving, worry time, and pleasant activities.
- Discussing mindfulness of uncontrollable events and eliciting reactions regarding sessions.
- Discussing significance of using skills being learned far in order to manage schedule of time
- Discussing progress achieved during therapy and areas of continuous effort and ongoing barriers.

Group 2, Standard Care Control Condition

Patients in the condition remained in compliance with the routine care protocols for osteoarthritis. This include physical modalities, exercise therapy and manual therapy for improvement of osteoarthritis patients.

13 RANDOMIZATION

After screening for eligibility criteria of inclusion and exclusion, patients was allocated to aforementioned two groups based on computerized randomization application.

14 **BLINDNESS**

Only subjects were masked from treatment protocols being provided in another group. Assessors and clinicians were aware of protocols and could not be managed to be masked, apparently due to very different protocols easily identifiable.

15 **OUTCOMES AND OUTCOME MEASURES**

- Numeric Pain Rating Scale
- Knee Injury and Osteoarthritis Outcome (KOOS)

16 **DATA COLLECTION PROCEDURE**

Pretreatment and post-treatment evaluation sessions was carried out before and after ten-week treatment period. During these evaluations' patients completed Numeric Pain Rating Scale and Knee Injury and Osteoarthritis Outcome (KOOS). They may also be interviewed regarding their use of medications. Each patient's body mass index also was taken on a standard scales in order to determine obesity status.

17 **DATA ANALYSIS**

The data was analyzed on SPSS for version 20. Statistical significance was set as 95%. Following tests were used. Number distribution along with relative pie and bar charts were calculated for qualitative demographics while mean and standard deviation calculated for quantitative variables of demography. Independent sample t test compared the means of outcome measures at pre-interventional and post-interventional levels.

18 ETHICAL CONSIDERATION

Ethical approval was taken from Research Review Committee of University of Health Sciences, Lahore and from the Clinical Setup being based as study setting.

19 RESULTS

The results about gender showed that 60/40 percent male/females in CBT group and those of 80/20 in control group. Results about educational status found to be 16% primary, 12% secondary, 12% tertiary and 60% nil in CBT group while 36% in primary, 16% secondary, 12% tertiary and 36% nil. The results about medication dependency showed that 68/32 percent dependency/occasional in CBT group and those of 76/24 in control group.

The results about hypertension showed that 36/64 percent yes/no in CBT group and those of 64/36 in control group. The results about hypertension showed that 40/60 percent yes/no in CBT group and those of 40/60 in control group. Descriptive results age $61.000+4.173$, onset $4.640+1.468$, ESR $29.800+2.516$ and walk time $14.800+3.696$ in CBT group and that of $58.360+3.956$, $4.520+1.045$, $29.920+2.481$ and $15.520+3.698$, respectively.

The descriptive statistics regarding CBT and Control group about walk time measured before treatment showed mean and standard deviation to be $14.800+3.696$ and $15.520+3.698$, respectively. Walk Time Mean Comparison between CBT and Control group before Treatment showed mean difference of 0.720 and non-significant p value 0.494, assuming equal variances.

The descriptive statistics regarding CBT and Control group about walk time measured after treatment showed mean and standard deviation to be $22.400+4.813$ and $18.880+4.226$, respectively. Walk Time Mean Comparison between CBT and Control group, after Treatment showed mean difference of 3.520 and significant p value 0.008, assuming equal variances.

The descriptive statistics regarding CBT and Control group about symptoms measured before treatment showed mean and standard deviation to be $15.440+2.381$ and $15.120+2.603$, respectively. K. Symptoms Mean Comparison between CBT and Control group, before Treatment

showed mean difference of 3.520 and non-significant p value 0.652, assuming equal variances. The descriptive statistics regarding CBT and Control group about symptoms measured after treatment showed mean and standard deviation to be 11.440+13.560 and 13.560+1.044, respectively. K. Symptoms Mean Comparison between CBT and Control group, after Treatment showed mean difference of 2.120 and significant p value 0.000, assuming equal variances. The descriptive statistics regarding CBT and Control group about stiffness measured before treatment showed mean and standard deviation to be 6.760+0.969 and 6.520+1.004, respectively. K. stiffness Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.2400 and non-significant p value 0.394, assuming equal variances. The descriptive statistics regarding CBT and Control group about stiffness measured after treatment showed mean and standard deviation to be 3.040+0.934 and 3.920+0.702, respectively. K. stiffness Mean Comparison between CBT and Control group, after Treatment showed mean difference of 0.880 and significant p value 0.000, assuming equal variances.

The descriptive statistics regarding CBT and Control group about pain measured before treatment showed mean and standard deviation to be 30.400+3.354 and 29.160+2.823, respectively. K. pain Mean Comparison between CBT and Control group, after Treatment showed mean difference of 1.240 and non-significant p value 0.164, assuming equal variances. The descriptive statistics regarding CBT and Control group about pain measured after treatment showed mean and standard deviation to be 16.00+0.235 and 20.040+2.207, respectively. K. pain Mean Comparison between CBT and Control group, after Treatment showed mean difference of 4.040 and significant p value 0.000, assuming equal variances. The descriptive statistics regarding CBT and Control group about function measured before treatment showed mean and standard deviation to be 53.120+5.479 and 54.800+5.708, respectively. K. function Mean Comparison

between CBT and Control group, before Treatment showed mean difference of 1.680 and non-significant p value 0.294, assuming equal variances.

The descriptive statistics regarding CBT and Control group about function measured after treatment showed mean and standard deviation to be 37.800+6.934 and 45.200+4.890, respectively. K. function Mean Comparison between CBT and Control group, after Treatment showed mean difference of 7.400 and significant p value 0.000, assuming equal variances. The descriptive statistics regarding CBT and Control group about sports measured before treatment showed mean and standard deviation to be 14.00+2.061 and 14.040+1.670, respectively. K. sports Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.040 and non-significant p value 0.940, assuming equal variances.

The descriptive statistics regarding CBT and Control group about sports measured after treatment showed mean and standard deviation to be 9.360+2.138 and 10.400+1.581, respectively. K. sports Mean Comparison between CBT and Control group, after Treatment showed mean difference of 1.040 and significant p value 0.05, assuming equal variances. The descriptive statistics regarding CBT and Control group about quality of life measured before treatment showed mean and standard deviation to be 11.200+1.658 and 11.680+1.519, respectively. K. quality of life Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.480 and non-significant p value 0.291, assuming equal variances. The descriptive statistics regarding CBT and Control group about quality of life measured after treatment showed mean and standard deviation to be 6.520+1.417 and 7.640+1.150, respectively. K. quality of life Mean Comparison between CBT and Control group, after Treatment showed mean difference of 1.120 and significant p value 0.004, assuming equal variances.

The descriptive statistics regarding CBT and Control group about total KOOS score measured before treatment showed mean and standard deviation to be 130.920 ± 8.025 and 131.320 ± 6.737 , respectively. Total KOOS Score Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.400 and non-significant p value 0.849, assuming equal variances. The descriptive statistics regarding CBT and Control group about total KOOS percentage measured before treatment showed mean and standard deviation to be 77.928 ± 4.776 and 78.167 ± 4.016 , respectively. Total KOOS Percentage Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.238 and non-significant p value 0.849, assuming equal variances.

The descriptive statistics regarding CBT and Control group about total KOOS score measured after treatment showed mean and standard deviation to be 84.160 ± 8.065 and 100.760 ± 6.443 , respectively. Total KOOS Score Mean Comparison between CBT and Control group, after Treatment showed mean difference of 16.600 and significant p value 0.000, assuming equal variances.

The descriptive statistics regarding CBT and Control group about total KOOS score percentage measured after treatment showed mean and standard deviation to be 50.095 ± 4.802 and 59.974 ± 3.835 , respectively. Total KOOS Score percentage Mean Comparison between CBT and Control group, after Treatment showed mean difference of 9.879 and significant p value 0.000, assuming equal variances.

The descriptive statistics regarding CBT and Control group about NPRS score measured before treatment showed mean and standard deviation to be 7.44 ± 0.506 and 7.400 ± 0.5000 , respectively. The descriptive statistics regarding CBT and Control group about NPRS score

measured after treatment showed mean and standard deviation to be 4.560 ± 0.506 and 5.680 ± 0.556 , respectively.

20 TABLES AND FIGURES

Table 1 Gender

Group			Number	Percent	Valid Percent	Cumulative Percent
CBT	Valid	Male	15	60.0	60.0	60.0
		Female	10	40.0	40.0	100.0
		Total	25	100.0	100.0	
Control	Valid	Male	20	80.0	80.0	80.0
		Female	5	20.0	20.0	100.0
		Total	25	100.0	100.0	

The results about gender showed that 60/40 percent male/females in CBT group and those of 80/20 in control group.

Table 2 Education

Group			Number	Percent	Valid Percent	Cumulative Percent
CBT	Valid	Primary	4	16.0	16.0	16.0
		Secondary	3	12.0	12.0	28.0
		Tertiary	3	12.0	12.0	40.0
		Nil	15	60.0	60.0	100.0
		Total	25	100.0	100.0	
Control	Valid	Primary	9	36.0	36.0	36.0
		Secondary	4	16.0	16.0	52.0
		Tertiary	3	12.0	12.0	64.0
		Nil	9	36.0	36.0	100.0
		Total	25	100.0	100.0	

Results about educational status found to be 16% primary, 12% secondary, 12% tertiary and 60% nil in CBT group while 36% in primary, 16% secondary, 12% tertiary and 36% nil.

Table 3 Medication

Group			Number	Percent	Valid Percent	Cumulative Percent
CBT	Valid	Dependent	17	68.0	68.0	68.0
		Occasional	8	32.0	32.0	100.0
		Total	25	100.0	100.0	
Control	Valid	Dependent	19	76.0	76.0	76.0
		Occasional	6	24.0	24.0	100.0
		Total	25	100.0	100.0	

The results about medication dependency showed that 68/32 percent dependency/occasional in CBT group and those of 76/24 in control group.

Table 4 Hypertension

Group			Number	Percent	Valid Percent	Cumulative Percent
CBT	Valid	Yes	9	36.0	36.0	36.0
		No	16	64.0	64.0	100.0
		Total	25	100.0	100.0	
Control	Valid	Yes	16	64.0	64.0	64.0
		No	9	36.0	36.0	100.0
		Total	25	100.0	100.0	

The results about hypertension showed that 36/64 percent yes/no in CBT group and those of 64/36 in control group.

Table 5 Diabetes

Group			Number	Percent	Valid Percent	Cumulative Percent
CBT	Valid	Yes	10	40.0	40.0	40.0
		No	15	60.0	60.0	100.0
		Total	25	100.0	100.0	
Control	Valid	Yes	10	40.0	40.0	40.0
		No	15	60.0	60.0	100.0
		Total	25	100.0	100.0	

The results about hypertension showed that 40/60 percent yes/no in CBT group and those of 40/60 in control group.

Table 6 Demographics Age, Onset, ESR, Walk Time

Statistics

	Group							
	CBT				Control			
	N		Mean	SD	N		Mean	SD
	Valid	Missing			Valid	Missing		
Age	25	0	61.0000	4.17333	25	0	58.3600	3.95685
Disease Duration	25	0	4.6400	1.46856	25	0	4.5200	1.04563
ESR	25	0	29.8000	2.51661	25	0	29.9200	2.48193
Walk Time	25	0	14.8000	3.69685	25	0	15.5200	3.69820

Descriptive results age 61.000 ± 4.173 , onset 4.640 ± 1.468 , ESR 29.800 ± 2.516 and walk time 14.800 ± 3.696 in CBT group and that of 58.360 ± 3.956 , 4.520 ± 1.045 , 29.920 ± 2.481 and 15.520 ± 3.698 , respectively.

Table 7 Walk Time Statistics before Treatment

Group Statistics					
	Group	N	Mean	SD	SE Mean
Walk Time	CBT	25	14.8000	3.69685	.73937
	Control	25	15.5200	3.69820	.73964

The descriptive statistics regarding CBT and Control group about walk time measured before treatment showed mean and standard deviation to be 14.800 ± 3.696 and 15.520 ± 3.698 , respectively.

Table 8 Walk Time Mean Comparison before Treatment

		t test						
		t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
							Lower	Upper
Walk Time	Variances Equal	-.688	48	.494	-.72000	1.04582	-2.82276	1.38276
	Equal variances not assumed	-.688	48.000	.494	-.72000	1.04582	-2.82276	1.38276

Walk Time Mean Comparison between CBT and Control group before Treatment showed mean difference of 0.720 and non-significant p value 0.494, assuming equal variances.

Table 9 Walk Time Statistics after Treatment

Group Statistics

	Group	N	Mean	SD	SE Mean
Post Interventional: Walk Time	CBT	25	22.4000	4.81318	.96264
	Control	25	18.8800	4.22611	.84522

The descriptive statistics regarding CBT and Control group about walk time measured after treatment showed mean and standard deviation to be 22.400+4.813 and 18.880+4.226, respectively.

Table 10 Walk Time Mean Comparison after Treatment

Independent Samples Test

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Post Interventional: Walk Time	Variances Equal	.379	.541	2.748	48	.008	3.52000	1.28104	.94429	6.09571
	Equal variances not assumed			2.748	47.210	.008	3.52000	1.28104	.94318	6.09682

Walk Time Mean Comparison between CBT and Control group, after Treatment showed mean difference of 3.520 and significant p value 0.008, assuming equal variances.

Table 11 Statistics of K. Symptoms before Treatment**Group Statistics**

	Group	N	Mean	SD	SE Mean
K: Symptoms	CBT	25	15.4400	2.38188	.47638
	Control	25	15.1200	2.60320	.52064

The descriptive statistics regarding CBT and Control group about symptoms measured before treatment showed mean and standard deviation to be 15.440+2.381 and 15.120+2.603, respectively.

Table 12 K Symptoms Mean Comparison before Treatment**Independent Samples Test**

	Levene's Method		t test							
	F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference		
								Lower	Upper	
K: Symptoms	Variances Equal	.072	.790	.453	48	.652	.32000	.70569	-1.09889	1.73889
	Equal variances not assumed			.453	47.626	.652	.32000	.70569	-1.09918	1.73918

K. Symptoms Mean Comparison between CBT and Control group, before Treatment showed mean difference of 3.520 and non-significant p value 0.652, assuming equal variances.

Table 13 Statistics of K. Symptoms after Treatment**Group Statistics**

	Group	N	Mean	SD	SE Mean
Post Interventional: K: Symptoms	CBT	25	11.4400	2.21886	.44377
	Control	25	13.5600	1.04403	.20881

The descriptive statistics regarding CBT and Control group about symptoms measured after treatment showed mean and standard deviation to be 11.440+13.560 and 13.560+1.044, respectively.

Table 14 Mean Comparison of K. Symptoms after Treatment

Independent Samples Test

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Post Interventional: K: Symptoms	Variences Equal	34.580	.000	-	48	.000	-2.12000	.49044	-	-
	Equal variances not assumed			4.323					34.130	.000
									3.11656	1.12344

K. Symptoms Mean Comparison between CBT and Control group, after Treatment showed mean difference of 2.120 and significant p value 0.000, assuming equal variances.

Table 15 Statistics of K. Stiffness before Treatment

Group Statistics

	Group	N	Mean	SD	SE Mean
K: Stiffness	CBT	25	6.7600	.96954	.19391
	Control	25	6.5200	1.00499	.20100

The descriptive statistics regarding CBT and Control group about stiffness measured before treatment showed mean and standard deviation to be 6.760+0.969 and 6.520+1.004, respectively.

Table 16 Comparison of K. Stiffness before Treatment

Independent Samples Test

	Levene's Method		t test							
	F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference		
								Lower	Upper	
K: Stiffness	Variances Equal	.230	.634	.859	48	.394	.24000	.27928	-.32154	.80154
	Equal variances not assumed			.859	47.938	.394	.24000	.27928	-.32156	.80156

K. stiffness Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.2400 and non-significant p value 0.394, assuming equal variances.

Table 17 Statistics of K. Stiffness after Intervention

Group Statistics

	Group	N	Mean	SD	SE Mean
Post Interventional: K: Stiffness	CBT	25	3.0400	.93452	.18690
	Control	25	3.9200	.70238	.14048

The descriptive statistics regarding CBT and Control group about stiffness measured after treatment showed mean and standard deviation to be 3.040+0.934 and 3.920+0.702, respectively.

Table 18 Comparison of K. Stiffness after Intervention**Independent Samples Test**

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Post	Variances Equal	1.426	.238	-	48	.000	-.88000	.23381	-	-.40990
Interventional:				3.764						
K: Stiffness	Equal variances not assumed			-	44.555	.000	-.88000	.23381	-	-.40895
				3.764					1.35105	

K. stiffness Mean Comparison between CBT and Control group, after Treatment showed mean difference of 0.880 and significant p value 0.000, assuming equal variances.

Table 19 Statistics of K. Pain before Intervention**Group Statistics**

		Group	N	Mean	SD	SE Mean
K: Pain	CBT		25	30.4000	3.35410	.67082
	Control		25	29.1600	2.82371	.56474

The descriptive statistics regarding CBT and Control group about pain measured before treatment showed mean and standard deviation to be 30.400+3.354 and 29.160+2.823, respectively.

Table 20 Comparison of K. Pain before Intervention

Independent Samples Test

	Levene's Method		t test							
	F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference		
								Lower	Upper	
K: Pain	Variances Equal	2.189	.146	1.414	48	.164	1.24000	.87689	-.52310	3.00310
	Equal variances not assumed			1.414	46.645	.164	1.24000	.87689	-.52443	3.00443

K. pain Mean Comparison between CBT and Control group, after Treatment showed mean difference of 1.240 and non-significant p value 0.164, assuming equal variances.

Table 21 Statistics of K. Pain after Intervention

Group Statistics

	Group	N	Mean	SD	SE Mean
Post Interventional: K: Pain	CBT	25	16.0000	.23540	.23540
	Control	25	20.0400	2.20756	.44151

The descriptive statistics regarding CBT and Control group about pain measured after treatment showed mean and standard deviation to be 16.00+0. 235 and 20.040+2.207, respectively.

Table 22 Comparison of K. Pain after Intervention

Independent Samples Test

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Post Interventional: K: Pain	Variances Equal	55.011	.000	-	48	.000	-4.04000	.44151	-	-
	Equal variances not assumed			9.150	24.000				.000	-4.04000
				9.150					4.95124	3.12876

K. pain Mean Comparison between CBT and Control group, after Treatment showed mean difference of 4.040 and significant p value 0.000, assuming equal variances.

Table 23 Statistics of K. Function before Treatment

Group Statistics

	Group	N	Mean	SD	SE Mean
K: Function	CBT	25	53.1200	5.47966	1.09593
	Control	25	54.8000	5.70818	1.14164

The descriptive statistics regarding CBT and Control group about function measured before treatment showed mean and standard deviation to be 53.120+5.479 and 54.800+5.708, respectively.

Table 24 Comparison of K. Function before Treatment

Independent Samples Test

	Levene's Method		t test							
	F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference		
								Lower	Upper	
K: Function	Variances Equal	.539	.467	-1.062	48	.294	-1.68000	1.58253	-4.86189	1.50189
	Equal variances not assumed			-1.062	47.920	.294	-1.68000	1.58253	-4.86203	1.50203

K. function Mean Comparison between CBT and Control group, before Treatment showed mean difference of 1.680 and non-significant p value 0.294, assuming equal variances.

Table 25 Statistics of K. Function after Intervention

Group Statistics

	Group	N	Mean	SD	SE Mean
Post Interventional: K: Function	CBT	25	37.8000	6.93421	1.38684
	Control	25	45.2000	4.89047	.97809

The descriptive statistics regarding CBT and Control group about function measured after treatment showed mean and standard deviation to be 37.800+6.934 and 45.200+4.890, respectively.

Table 26 Comparison of K. Function after Intervention

Independent Samples Test

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Post Interventional: K: Function	Variances Equal	2.553	.117	-	48	.000	-7.40000	1.69706	-	-
	Equal variances not assumed			-	43.140	.000	-7.40000	1.69706	10.81216	3.98784
				4.360					10.82212	3.97788

K. function Mean Comparison between CBT and Control group, after Treatment showed mean difference of 7.400 and significant p value 0.000, assuming equal variances.

Table 27 Statistics of K. Sports Function before Intervention**Group Statistics**

	Group	N	Mean	SD	SE Mean
K: Sports Function	CBT	25	14.0000	2.06155	.41231
	Control	25	14.0400	1.67033	.33407

The descriptive statistics regarding CBT and Control group about sports measured before treatment showed mean and standard deviation to be 14.00+2.061 and 14.040+1.670, respectively.

Table 28 Comparison of K. Function before Intervention**Independent Samples Test**

	Levene's Method		t test							
	F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference		
								Lower	Upper	
K: Sports Function	Variances Equal	2.385	.129	-.075	48	.940	-.04000	.53066	-1.10696	1.02696
	Equal variances not assumed			-.075	46.021	.940	-.04000	.53066	-1.10815	1.02815

K. sports Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.040 and non-significant p value 0.940, assuming equal variances.

Table 29 Statistics of K. Sports Function after Treatment**Group Statistics**

	Group	N	Mean	SD	SE Mean
Post Interventional: K: Sports Function	CBT	25	9.3600	2.13854	.42771
	Control	25	10.4000	1.58114	.31623

The descriptive statistics regarding CBT and Control group about sports measured after treatment showed mean and standard deviation to be 9.360+2.138 and 10.400+1.581, respectively.

Table 30 Comparison of K. Sports Function after Intervention**Independent Samples Test**

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Post Interventional: K: Sports Function	Variances Equal	2.311	.135	-	48	.056	-1.04000	.53191	-	.02949
	Equal variances not assumed			1.955					44.202	

K. sports Mean Comparison between CBT and Control group, after Treatment showed mean difference of 1.040 and significant p value 0.05, assuming equal variances.

Table 31 Statistics of K. Quality of Life before Treatment**Group Statistics**

	Group	N	Mean	SD	SE Mean
K: Quality of Life	CBT	25	11.2000	1.65831	.33166
	Control	25	11.6800	1.51987	.30397

The descriptive statistics regarding CBT and Control group about quality of life measured before treatment showed mean and standard deviation to be 11.200+1.658 and 11.680+1.519, respectively.

Table 32 Comparison of K. Quality of Life before Treatment**Independent Samples Test**

	Levene's Method		t test							
	F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference		
								Lower	Upper	
K: Quality of Life	Variances Equal	.638	.428	-1.067	48	.291	-.48000	.44989	-1.38456	.42456
	Equal variances not assumed			-1.067	47.640	.291	-.48000	.44989	-1.38474	.42474

K. quality of life Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.480 and non-significant p value 0.291, assuming equal variances.

Table 33 Statistics of K. Quality of Life after Treatment**Group Statistics**

	Group	N	Mean	SD	SE Mean
Post Interventional: K: Quality of Life	CBT	25	6.5200	1.41774	.28355
	Control	25	7.6400	1.15036	.23007

The descriptive statistics regarding CBT and Control group about quality of life measured after treatment showed mean and standard deviation to be 6.520+1.417 and 7.640+1.150, respectively.

Table 34 Comparison of K. Quality of Life after Intervention**Independent Samples Test**

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Post Interventional: K: Quality of Life	Variances Equal	2.146	.149	-	48	.004	-1.12000	.36515	-	-.38582
	3.067			1.85418						
	Equal variances not assumed			-	46.046	.004	-1.12000	.36515	-	-.38501
				3.067					1.85499	

K. quality of life Mean Comparison between CBT and Control group, after Treatment showed mean difference of 1.120 and significant p value 0.004, assuming equal variances.

Table 35 Statistics of Total KOOS Score before Treatment**Group Statistics**

	Group	N	Mean	SD	SE Mean
Total KOOS Score	CBT	25	130.9200	8.02558	1.60512
	Control	25	131.3200	6.73746	1.34749

The descriptive statistics regarding CBT and Control group about total KOOS score measured before treatment showed mean and standard deviation to be 130.920+8.025 and 131.320+6.737, respectively.

Table 36 Comparison of Total KOOS Score before Intervention**Independent Samples Test**

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Total KOOS Score	Variances Equal	2.170	.147	-.191	48	.849	-.40000	2.09574	-4.61377	3.81377
	Equal variances not assumed			-.191	46.602	.849	-.40000	2.09574	-4.61704	3.81704

Total KOOS Score Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.400 and non-significant p value 0.849, assuming equal variances.

Table 37 Statistics of KOOS Percentage before Treatment**Group Statistics**

	Group	N	Mean	SD	SE Mean
Pre-Interventional KOOS Percentage	CBT	25	77.9284	4.77684	.95537
	Control	25	78.1672	4.01068	.80214

The descriptive statistics regarding CBT and Control group about total KOOS percentage measured before treatment showed mean and standard deviation to be 77.928+4.776 and 78.167+4.016, respectively.

Table 38 Comparison of KOOS Percentage before Treatment**Independent Samples Test**

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Pre-Interventional KOOS Percentage	Variances Equal	2.169	.147	-.191	48	.849	-.23880	1.24746	-2.74698	2.26938
	Equal variances not assumed			-.191	46.604	.849	-.23880	1.24746	-2.74892	2.27132

Total KOOS Percentage Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.238 and non-significant p value 0.849, assuming equal variances.

Table 39 Statistics of Total KOOS Score after Intervention

Group Statistics

	Group	N	Mean	SD	SE Mean
Post Interventional: Total KOOS Score	CBT	25	84.1600	8.06577	1.61315
	Control	25	100.7600	6.44386	1.28877

The descriptive statistics regarding CBT and Control group about total KOOS score measured after treatment showed mean and standard deviation to be 84.160+8.065 and 100.760+6.443, respectively.

Table 40 Comparison of Total KOOS Score after Intervention

Independent Samples Test

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Post Interventional: Total KOOS Score	Variances Equal	2.691	.107	-8.040	48	.000	-16.60000	2.06475	-20.75146	-12.44854
	Variances not assumed			-8.040					45.769	.000

Total KOOS Score Mean Comparison between CBT and Control group, after Treatment showed mean difference of 16.600 and significant p value 0.000, assuming equal variances.

Table 41 Statistics of KOOS Percentage after Intervention**Group Statistics**

	Group	N	Mean	SD	SE Mean
Post Interventional KOOS Percentage	CBT	25	50.0952	4.80203	.96041
	Control	25	59.9748	3.83569	.76714

The descriptive statistics regarding CBT and Control group about total KOOS score percentage measured after treatment showed mean and standard deviation to be 50.095+4.802 and 59.974+3.835, respectively.

Table 42 Comparison of KOOS Percentage after Intervention**Independent Samples Test**

		Levene's Method		t test						
		F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Post Interventional KOOS Percentage	Variances Equal	2.696	.107	-8.038	48	.000	-9.87960	1.22918	-12.35103	-7.40817
	Equal variances not assumed			-8.038	45.765	.000	-9.87960	1.22918	-12.35415	-7.40505

Total KOOS Score percentage Mean Comparison between CBT and Control group, after Treatment showed mean difference of 9.879 and significant p value 0.000, assuming equal variances.

Table 43 NPRS before Intervention

Group Statistics

	Group	N	Mean	SD	SE Mean
Numeric Pain Rating Score	CBT	25	7.4400	.50662	.10132
	Control	25	7.4000	.50000	.10000

The descriptive statistics regarding CBT and Control group about NPRS score measured before treatment showed mean and standard deviation to be 7.44+0.506 and 7.400+0.5000, respectively.

Table 44 Comparison of NRPS before Intervention

Independent Samples Test

	Levene's Method		t test						
	F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
								Lower	Upper
Numeric Pain Rating Score	.299	.587	.281	48	.780	.04000	.14236	-.24624	.32624
			.281	47.992	.780	.04000	.14236	-.24624	.32624

NPRS Mean Comparison between CBT and Control group, before Treatment showed mean difference of 0.040 and significant p value 0.780, assuming equal variances.

Table 45 Statistics of NRPS after Intervention

Group Statistics

	Group	N	Mean	SD	SE Mean
Post Interventional: Numeric Pain Rating Score	CBT	25	4.5600	.50662	.10132
	Control	25	5.6800	.55678	.11136

The descriptive statistics regarding CBT and Control group about NPRS score measured after treatment showed mean and standard deviation to be 4.560+0.506 and 5.680+0.556, respectively.

Table 46 Comparison of NRPS after Intervention

Independent Samples Test

	Levene's Method		t test						
	F	Sig.	t	df	P value	Mean Difference	SE. Diff.	95% Confidence Interval of the Difference	
								Lower	Upper
Post Interventional: Numeric Pain Rating Score	.004	.950	-	48	.000	-1.12000	.15055	-	-.81729
Equal variances assumed			7.439					1.42271	
	.004	.950	-	47.579	.000	-1.12000	.15055	-	-.81722
Equal variances not assumed			7.439					1.42278	

NPRS Mean Comparison between CBT and Control group, after Treatment showed mean difference of 1.120 and significant p value 0.000, assuming equal variances.

CONCLUSION

The study concluded that cognitive behavior therapy had remarkable role in improving pain, mobility and disability in patients with osteoarthritis when combined with routine physical therapy. It should be considered to include cognitive behavior therapy as part of treatment while managing osteoarthritis

RECOMMENDATIONS

In light of findings of this study we suggest that there should be a Holistic screening of every patient regarding any degenerative disease or musculoskeletal disorder if the patient is having any disease related criteria depression. So that along with the physical component the disease.

There should be formulated educational material for Awareness of significance of psycho-social treatment for patients of osteoarthritis. So that clean Nation can also be made aware of importance of psycho-social management of patients.

There should be professional development courses for practice regarding cognitive behavior therapy so that every musculoskeletal disorder can be recovered from its psychosocial aspects as well.

LIMITATIONS

The major limitation of cognitive behaviour therapy was cognitive level of patients. Every patient has different cognition level and therefore it was difficult to make point to every patient equally. Furthermore, it was difficult to retain patient in routine physical therapy group, and there have to to make arrangements are alternative recruitments of for patients.

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