Enhancing Quality of Life and Alleviating Pain: A Comparative Analysis of Mobilization with Movement vs. Sham Mobilization in Knee Osteoarthritis Patients

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ABSTRACT:

Objectives:

To compare the effects of Mobilization with Movement on pain and quality of life in knee osteoarthritis patients with Sham Mobilization.

Methodology: ARCT was conducted in DHQ Hospital and Faisal Hospital Faisalabad for four months; May-August 2023 on 54 individuals allocated into two groups by lottery method. One group received Mobilization with Movement(MWM)while the other received Sham Mobilization for 4weeks by taking measurements of NPRS, SF-12 (PCS and MCS), and knee ROMsatbaselineandtheendof theintervention. The data was collected from patients after obtaininginformedconsent. The Faisal Institute of Health Sciences signed an ethical letter for the study. An Independent sample T-test and Paired sample T-test were used for normally distributed data while the Mann-Whitney test and Wilcoxon Signed Rank test were used for abnormally distributed data.

Results: There was a significant difference in NPRS, SF-12, and knee ROMS values between the two groups.(NPRS p=0.000,PCSSF-12p<0.04,MCSSF-12p<0.04,and all ROM p<0.05).However, the MWM group was more effective in reducing pain, enhancing the QOL, and improving ROM as compared to the SM group; NPRS (3.25±0.98,4.87±1.15),PCS of SF-12(38.58±5.59,34.83±4.97), MCS of SF-12(56.29±6.18,50.79±5.99) and all ROMs (p<0.05).

Conclusion: The study showed that Mobilization with movement was moreeffectivethan sham mobilizationforpatients withkneeosteoarthritis.

Keywords: Knee Osteoarthritis, Mobilization with Movement, Quality of Life, Pain.

1. INTRODUCTION:

Osteoarthritis (OA),the most prevalent type of arthritis, is a degenerative disease of bone and joints.[1]The knee is frequently affected by OA due to its need to support weight and a high degree of movement.[2]Morning stiffness in the joint restricts everyday activities and lowers the quality of life.[3]The prevalence of knee OA is 16.0%, 22.9%, and 9.6% over the age of 15, 40, and 60, respectively.[4]

The prevalence of OA in the Eastern Mediterranean Region nations was 9.7-37.3, in Korea was 35.1%, and in the UK women (45-60 years) was 17.6% as seen on X-rays.[5-7] Ethnicity has been identified as a social and demographic factor that affects differences in the occurrence of OA.[8]

In the initial stages of knee osteoarthritis (KOA), there are noticeable modifications in the composition of collagen and proteoglycans leading to meniscus injury.[9] The final phase of cartilage degradation involves cell death of chondrocytes, enhancing degradation.[10]Several factors contribute to the risk of knee OA,including obesity and modifiable risk factors.[11]

The available treatments for OA involve surgical replacement of the affected joint, medications, and non-pharmacological (exercise and physical

therapy).[12] Assistive devices (knee braces and insoles) can be utilized to modify the mechanics of the knee joint.[13]MWMis a widely recognized manual treatment for musculoskeletal disorders.[14]

KOA alters the subchondral bones' shape and causes cartilage to deteriorate and soft tissues around the cartilage to be harmed.[15] KOA produces several other issuesthat affect patients' QOL.[16]The research question of the study was, what is the effect of MWM on pain, QOL, and ROM in patients with knee osteoarthritis as compared to Sham Mobilization?

2. METHODOLOGY:

Following anRCT, a single-blinded study was conducted in Faisal Hospital Faisalabad and DHQ Faisalabad for four months; May-August 2023. The ethics committee of Faisal Hospital (FIHS), Faisalabad, Pakistan, duly approved the study numbered FIHS/23/8.The sample size was 48 divided into two groups with an expected mean difference of 6.28; Group A treated with Mobilization With Movement (24 participants with S.D. of 9.24 and Variance of 85.4) and Group B treated with Sham Mobilization (24 participants with S.D. of 7.07 and Variance of 49.9) having 95% Confidence Interval, aged between 38-50 years, having grade 1-2 Knee Osteoarthritis and NPRS scores between 3-7 were selected via a purposive sampling technique, calculated by using the formula;

$$\text{Sample size} = \frac{(Z_{1-\beta} + Z_{1-\alpha}/2)^2(\delta_1)^2 + (\delta_2)^2}{(\mu_1-\mu_2)^2}$$

However, individuals with hypermobility of the knee joint, fracture of the knee joint, malignancy of the knee, and any bone disease were excluded from the study. The data were collected through theNPRS to measure Pain, a Goniometer for ROM, and an SF-12 Questionnaire to measure the QOL. A four-week treatment plan was designed, and the reading was taken at the baseline and after 4th week. The participants received 12 sessions (3 sessions per week).

Statistical Analysis:

The Shapiro-Wilk test was used to determine the data's initial normalcy. MCS-12 score of SF-12 was normally distributed; soan Independent sample T-test was used to analyze the effects between two groups, while a Paired sample T-test was used to analyze the impacts on individuals within a group. The NPRS, RKnee Flexion, RKnee Extension, LKnee Flexion, LKnee Extension, and PCS-12 score of SF-12were abnormally distributed so the Mann-Whitney test was used to determine the effects between groups, and the Wilcoxon Signed Rank test was used to determine the effects within group participants. P-value ≤ 0.05 was considered significant.

3. RESULTS:

This was anRCT. A sample of 48 patients was randomly allocated to two groups with 24 patients in Group A (MWM group) and 24 patients in Group B (SM group). There were 31(64.8%) females and 17 (35.42%) males in the sample.

Shapiro Wilk test was used to study the normality of data. Data was found to be normally distributed for the MCS 12 score. An Independent Sample T-test was conducted to find between-group differences for this outcome measure and a significant difference was seen in the mean value after treatment (Table 1)

Table. 1: Between Group Comparison in both groups in MCS-12 Score

	Groups	Mean ± SD	P. Value
MCS-12 Score at Pre-Treatment	**MMW**	49.08 ±6.24	0.907
	SM	48.87 ± 6.08	
MCS-12 Score at Post-Treatment	**MMW**	56.29 ± 6.11	0.003
	SM	50.79 ± 5.99	

Paired Sample T-test was conducted for within-group analysis (There was a significant improvement in the mean value of the MCS 12 score in the MWM Group from baseline to post-treatment session with p value less than 0.05) as shown in Table 2.

Table. 2: Within Group comparison for MCS-12 Score

Groups	Baseline	Post Treatment	P. Value
MMW	49.08 ± 6.24	56.29 ± 6.11	<.001
SM	48.87 ± 6.08	50.79 ± 5.99	<.001

Data was not found normally distributed for the NPRS, Knee ROM, and PCS 12

score. TheMann-Whitney U test was conducted to find between-group differences for these outcome measures. The results showed a significant improvement in the mean value inthe 4th week in Group A (MWM) having a p-value less than 0.05 compared to Group B (SM).(Table 3)

Table. 3: Between Group analysis by Mann-Whitney U Test

Outcome Measure	Group A		P-Value	Group B	
	Baseline	4th Week		Baseline	4th Week
NPRS	25.29	16.25	<.001	23.71	32.75
RKnee flexion	25.88	16.44	<.001	23.13	17.56
RKnee extension	23.46	13.88	<.001	25.54	35.13
LKnee flexion	26.52	17.27	<.001	22.48	16.73
LKnee extension	23.46	13.33	<.001	25.54	35.67
PCS-12 Score	21.71	12.29	<.001	28.58	20.42

The Wilcoxon Signed Rank test was conducted for within-group analysis. The results showed a significant improvement in the mean value of NPRS, Knee

ROM, and PCS-12 score in the 4th week in Group A (MWM) having a p-value less than 0.05.(Table 4)

Table. 4: Within Group analysis by Wilcoxon Ranked Test

Group	Outcome Measure	Baseline	Post-Treatment	P-Value
		Mean ± SD	Mean ± SD	
Group A (MWM)	NPRS	6.04 ± 0.90	3.24 ± 0.98	<0.001
	RKnee flexion	111.04 ± 6.61	121.25 ± 6.63	
	RKnee extension	5.50 ± 1.40	1.91 ± 1.05	
	LKnee flexion	114.16 ± 6.37	123.87 ± 5.95	
	LKnee extension	5.33 ± 1.30	1.75 ± 8.96	
	PCS-12 Score	30.07 ± 5.41	38.58 ± 3.01	
Group B (SM)	NPRS	5.91 ± 0.97	4.87 ± 1.15	
	RKnee flexion	109.79 ± 7.55	113.79 ± 7.29	

	RKnee extension	5.75 ± 1.56	4.87 ± 1.59	
	LKnee flexion	111.79 ± 8.08	114.87 ± 7.77	
	LKnee extension	5.54 ± 1.31	4.66 ± 1.21	
	PCS-12 Score	32.17 ± 5.53	34.83 ± 4.97	

4. DISCUSSION:

The current study compares the effects of MWMversus SMon pain, QOL, and ROM in participants suffering from OA of knee. The study showed that MWM was more effective than SM in decreasing pain and enhancing the QOL and ROM.

In 2019 study, Alkhawajah&Alshami found that compared to SMWM, MWM significantly improved knee discomfort ($p<0.001$), knee function, and ROM ($p<0.001$), as well as enhancing knee flexors and extensors power and reduced TUG time.[17]The study aligns with current findings: MWM reduced pain ($P=0.00$) and increased ROM significantly, as indicated by NPRS improvement ($P=0.680$ to $P=0.00$) and enhanced knee flexion ROM ($P=0.00$) post-treatment.

In their 2018 study, Kiran et al. found that combining MMWM alongside traditional treatments for KOAnotably reduced discomfort (from 5.06±1.06 to 1±0.68), improved ROM (knee flexion from 111±3 to 121±4 and knee

extension from 5.1±1 to 1±0.5), and enhanced functional abilities within a 2-week treatment protocol.[18]In line with prior research,the current study employed MWM, resulting in reduced pain and increased ROM. Notably, after a 4-week treatment, significant improvements were observed in NPRS scores (from 6.04± .90 to 3.25± .98), right and left knee flexion (111.04±6.61 to 121.25±6.63 and 114.16±6.37 to 123.87±5.95, respectively), as well as right and left knee extension (5.50±1.50 to 1.91±1.05 and 5.33±1.30 to 1.75±.89, respectively).

Mahmooda et al. conducted a study in 2020 to find out how well MMWMand Myofascial release work on pain, ROM, and ability to do daily tasks in subjects who had KOA. It concluded that KOA pain (from 5.20±0.67 pre-treatment to 0.67±0.97 after the 10th session) and ROMwere improved by Mulligan's MWM.[19] The above-mentioned study supports the result of the current study because the current study exhibited participants that treated with MWM had reduced pain (from 6.04± .90 at baseline to 3.25± .98 after 4th week) and improved range of motion.

Kulkarni et al. conducted a study to evaluate the impact of Mulligan mobilization combined with movement strategies on osteoarthritis pain in the knee. The study found that the MMWM method helped decrease discomfort (VAS score from 5.80± 0.94 pre-treatment to 4.13± 1.24 post-treatment) in people who had knee osteoarthritis.[20] The current study provides consistent

results with the previous study because the current study also used MWM which decreased pain (NPRS from 6.04± .90 to 3.25± .98).

5. CONCLUSION:

The study demonstrates that MWM is more effective than SM in improving daily activities for knee osteoarthritis. While both reduce pain, MWM enhances the efficacy of physiotherapy, reduces disability, and enhances overall quality of life compared to SM.

6. CONFLICT OF INTEREST:

By none

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