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Effectiveness of Mulligan Manual Therapy with Mind Body Therapy In Migraine Patients

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ABSTRACT

Background: Migraines are a common neurological disorder characterized by recurrent episodes of moderate-to-severe headaches, often accompanied by nausea, sensitivity to light and sound, and reduced cervical mobility. While pharmacological treatments are widely used, non-pharmacological approaches such as Mulligan Manual Therapy (MMT) and Mind-Body Therapy (MBT) have shown promise in managing migraine symptoms. However, limited research has explored the combined effects of these interventions.

Objective: This study aimed to evaluate the effectiveness of combining MMT and MBT in migraine patients by assessing pain intensity, cervical range of motion (ROM), perceived stress levels, and migraine-specific quality of life (MSQ).

Methods: A randomized clinical trial was conducted with 70 migraine patients, divided into two groups. Group A received only MMT, while Group B received a combination of MMT and MBT. The intervention lasted four weeks, with outcome measures including the Visual Analog Scale (VAS) for pain intensity, goniometric assessment of cervical ROM, the Perceived Stress Scale (PSS), and the Migraine-Specific Quality of Life Questionnaire (MSQ).

Results: Both groups showed significant improvements post-treatment. Pain intensity (VAS scores) reduced in both groups, with Group A decreasing from 6.94 to 3.88 and Group B from 7.02 to 3.97. Cervical ROM improved more in Group B, with flexion increasing from 35.77° to 45.85°, compared to 36.91° to 41.45° in Group A. Stress levels (PSS scores) decreased more significantly in Group B (28.14 to 12.22) compared to Group A (33.71 to 21.91). MSQ scores also improved more in Group B (60.37 to 80.48) than in Group A (54.57 to 66.65).

Conclusion: The combination of MMT and MBT demonstrated superior benefits in reducing stress, improving cervical ROM, and enhancing quality of life in migraine patients compared to MMT alone. These findings highlight the potential of an integrated approach for migraine management. Future research should explore long-term effects and larger sample sizes to validate these results.

Keywords: *Migraine, Mulligan Manual Therapy, Mind-Body Therapy, quality of life, Pain Management, Non-Pharmacological Treatment.*

1. INTRODUCTION

The term "migraine" originates from the Greek word "hemicranias," which means "half of the head." This reflects a notable characteristic of the condition, as most individuals experience pain on one side of the head. However, it is also common for pain to occur on both sides, affecting both the front and back of the head. The pain associated with migraines is commonly described as throbbing or pulsating in nature. This intense headache can be exacerbated by physical exertion or movement, making even routine activities challenging for those affected. (1) The global prevalence of migraines in both males and females is estimated to be between 15% and 18%.(2) Migraine is a debilitating condition that affects millions of people worldwide. It is considered the eighth most burdensome health issue globally and ranks fourth among women specifically.(3) A complicated neurological illness with a genetic component, migraine is represented by episodes of moderate-to-severe headaches, usually unilateral, often accompanied by nausea and increased sensitivity to light and sound. These episodes, sometimes referred to as migraine attacks, can last anywhere from a few hours to several days and have an immense impact on the daily activities of individuals and their quality of life. Migraine symptoms can vary greatly from person to person and include variables like stress, hormone changes, food choices, and environmental factors. Recurrent and complex neurological events are migraine episodes. 75% of migraine incidents are migraine without aura, making it the most prevalent form. [4]

Migraine has two main subtypes. Migraine without Aura: This is a clinical syndrome characterized by a headache that has specific features and is accompanied by certain symptoms. These additional symptoms can make ordinary activities feel overwhelmingly uncomfortable or even impossible. The duration of the headache can vary, lasting from several hours to a

few days, and during this time, the individual's quality of life may significantly decline due to the severity of the pain and its associated effects. Migraine With Aura: This subtype is distinguished by the presence of neurological symptoms called "aura" that occur prior to or sometimes during the headache. These auras can manifest in various ways, most commonly as visual disturbances—individuals may see shimmering lights, zigzag lines, or blind spots known as scotomas. Other sensory changes may include tingling or numbness, which typically begins in the fingers or around the mouth, and can even extend to the face. Some people may experience difficulties with language or speech, making it hard to articulate thoughts or find the right words. Auras usually develop gradually, peaking within 20 to 30 minutes, and often resolve as the headache sets in. Moreover, some individuals may experience a premonitory phase, which serves as an early warning of the impending migraine. This phase can last from a few hours to several days and is characterized by a range of subtle yet distinct changes in the body and mind. Patients may feel unusually energetic or restless, followed by sudden bouts of fatigue or lethargy. Mood fluctuations, including irritability or mild depression, can occur, coupled with cravings for specific foods, which may

Foreshadow the onset of a migraine. Physical symptoms such as repetitive yawning and neck stiffness can also arise. After the peak of the headache subsides, many individuals enter a resolution phase, where the pain gradually lessens. During this time, feelings of exhaustion and general malaise are common, as the body begins to recover from the exertion of the migraine attack. Understanding these stages and symptoms in detail can significantly assist in the effective management and treatment of migraines, empowering individuals to identify triggers and respond proactively to their condition. (5)

The two most common primary headaches are migraines and tension-type headaches (TTH). Patients are often referred to physiotherapy to support medication treatment. In addition to pharmacological options, healthcare providers recommend non-pharmacological strategies like biofeedback, acupuncture, relaxation techniques, and physical therapy to enhance pain relief and improve overall well-being. Together, these approaches create a comprehensive management plan for headache sufferers.(6) This may consist of exercise to strengthen neck muscles and improve flexibility, along with spinal manual therapy to relieve neck pain and enhance range of motion.(7) Neck pain is a common symptom of cervicogenic headache (CGH)(8) but is also frequently experienced by individuals suffering from migraines and tension-type headaches (TTH)(9). In cases of migraine, neck pain is more common than nausea (10)and is positively correlated with headache frequency, contributing to increased overall headache-related disability(11,12)

Mulligan mobilization, a type of joint mobilization developed by Brian Mulligan, is a manual therapy technique widely used by physical therapists. It is based on the physiological joint movement principles of Kaltenborn. This technique includes various methods, such as Sustained Natural epiphyseal Glides (SNAGs) and natural epiphyseal glides, which primarily target the spine. The Mulligan mobilization approach aims to reduce pain, correct functional disorders, and improve joint range of motion (Mulligan, 1993).(13) In this approach, a gentle and sustained manual force is applied to the upper cervical spine to relieve headaches or enhance its mobility.(14) Research suggests that Mulligan manual therapy can improve cervical range of motion, reduce muscle tension, and decrease both the frequency and intensity of headaches. Furthermore, it may enhance overall function for individuals suffering from migraines. While more large-scale studies are necessary to confirm these findings, the existing evidence supports its potential as a complementary treatment for migraine sufferers with cervical involvement.(15)

Mind–body therapies (MBTs) are a group of therapies that focus on the connection between the brain and body to support the healing process. Most of these therapies are rooted in ancient practices and traditions. It is believed that they can have beneficial effects on both mental and physical health, and they are commonly used to manage symptoms and enhance overall well-being. Given that stress is a significant migraine trigger, these therapies offer a holistic approach to migraine management. (16) Mind-body therapies, such as relaxation techniques, meditation, guided imagery, and cognitive-behavioral therapy, have been researched for their effectiveness in managing pain-related conditions, including migraines. Evidence from randomized controlled trials and systematic reviews indicates that these therapies can be beneficial as additional treatments for various pain conditions.(17) Research shows that mind/body and behavioral treatments can reduce the frequency of migraine and tension-type headaches by 35-50%. This effect size is similar to that seen in medication trials, but these treatments generally have fewer side effects. The greatest benefits are observed when these non-pharmacological treatments are used alongside medications.(18) A study revealed that adults suffering from migraines or severe headaches are more likely to use complementary and alternative medicine (CAM) compared to those who do not experience such issues. Among the most frequently used CAM modalities are mind-body therapies, including deep breathing exercises, meditation, and yoga. However, more than 50% of adults with migraines or severe headaches who reported using CAM have not discussed their usage with their healthcare provider.(19) Exercise is a vital element of mind-body therapy, and emerging evidence suggests that it can be beneficial in preventing migraines. A scoping review on the effects of exercise in migraine management indicates that physical activity may help decrease the frequency and intensity of migraines. This is achieved by improving cardiovascular health, enhancing the release of endorphins, and reducing stress levels.(20)

Combining Mulligan manual therapy with mind-body therapy provides a comprehensive approach to managing migraines. Mulligan manual therapy focuses on improving upper cervical mobility and addressing musculoskeletal issues that contribute to headache symptoms. In contrast, mind-body therapies such as meditation, cognitive-behavioral therapy (CBT), and relaxation techniques target stress-related triggers and enhance self-regulation. By integrating these two approaches, patients

can experience physical relief from musculoskeletal dysfunction while also building adaptability against stress-induced migraine episodes. Studies have suggested effectiveness of Mulligan manual therapy and mind-body therapy but these two techniques have been done separately. This study will combine these two techniques and evaluate the effectiveness in migraine patients.

2. MATERIALS AND METHOD

This experimental study was a randomized clinical trial conducted in Karad over six months, involving 70 participants selected through simple random sampling. Then the participants is divided into 35 groups, group A and group B. The study utilized various materials, including a data collection sheet, consent forms in Marathi and English, and a goniometer for measurements**. Inclusion criteria** required participants to be adults aged 18-45 years, diagnosed with migraines based on the International Headache Society (IHS) criteria, and meeting the ICHD-3 criteria for episodic migraine with or without aura for over a year. Additionally, participants needed to experience at least four migraine episodes per month, have a history of migraines for at least six months, and exhibit reduced cervical mobility. **Exclusion criteria** eliminated individuals with other types of headaches, including sinus headaches, those under 18 years of age, individuals with unstable psychiatric conditions, and those with a recent history of skull trauma. The study outcomes were measured using the Visual Analog Scale (VAS) for pain intensity, cervical range of motion (ROM) assessment, the Perceived Stress Scale (PSS) for stress levels, and the Migraine-Specific Quality of Life Questionnaire (MSQ) to evaluate the impact of migraines on daily life.

Procedure

This study will be on the effectiveness of Mulligan Manual Therapy combined with mind-body therapy in reducing symptoms and improving the neck mobility in patients with migraines. Certification has taken from protocol committee. Then permission has taken from authorities and ethical committee. Based on the required criteria, the sample population was selected. The selected population has explained the purpose of this study and given appropriate instructions. A consent form has filled out by the participants in the study. Then a data collection sheet has been given to participants who have filled out the consent form. It is provided only in offline mode. The sample size has calculated with the help of statistical data. Then the subjects are divided into two groups. Groups are referred to as Group A and Group B. Group A, is given mulligan manual therapy and Group B is given mulligan manual therapy with mind body therapy. Both treatments lasted 4 weeks and included six sessions (three sessions per week) with a duration of 30 min per session. Assessment has taken after the end of treatment and after 1 month follow-up.

Intervention

The **Mulligan Manual Therapy (MMT) protocol** was implemented over four weeks, focusing on improving cervical mobility, reducing pain, and enhancing function. Sessions were conducted **3-4 times per week** with gradual progression. In **Week 1**, baseline assessment was followed by Sustained Natural Apophyseal Glides (SNAGs) for the upper cervical spine, performed **10 repetitions per side, held for 5-10 seconds**. Mobilization with Movement (MWM) for cervical rotation and flexion-extension was introduced, performed in **3 sets of 10 repetitions.** Postural correction exercises were also initiated. **Week 2** incorporated deep cervical flexor strengthening exercises with **10-second holds, 3 sets of 10 repetitions**, along with progressive SNAGs and MWMs with increased resistance. In **Week 3**, advanced spinal mobilization techniques, including passive physiological movements, were introduced to improve segmental mobility, alongside functional retraining exercises. Finally, in **Week 4**, self-management strategies, such as ergonomic training and a home exercise program including daily SNAGs and MWMs, were emphasized to maintain the achieved improvements.

The **Mind-Body Therapy (MBT) protocol** was also structured over four weeks, aiming to reduce stress-related migraine triggers through relaxation and cognitive strategies. Sessions were conducted **daily for at least 20-30 minutes**. In **Week 1**, diaphragmatic breathing using the **4-7-8 technique** was practiced in **10-minute sessions twice daily**, along with Progressive Muscle Relaxation (PMR), where muscles were contracted for **5-7 seconds and relaxed for 10 seconds** across all major muscle groups. Mindfulness meditation was also introduced with **10-minute guided sessions**. In **Week 2**, Cognitive-Behavioral Therapy (CBT) strategies such as cognitive restructuring and stress management techniques were incorporated, along with biofeedback training to regulate physiological responses. Yoga therapy with gentle stretches, held for **15-30 seconds**, was added. **Week 3** emphasized deep relaxation strategies, including guided imagery and advanced meditation techniques practiced for **15-20 minutes daily**, while yoga-based movement therapy was included to enhance neuromuscular control. Patients were also encouraged to journal their stressors and triggers. Finally, in **Week 4**, participants integrated these techniques into their daily routines, focusing on long-term stress management. A final assessment was conducted to evaluate stress reduction and overall well-being

3. RESULTS

Control group

Mulligan manual therapy

Table no.1- statistical analysis for group a: (age)

Mean	31.97
SD	7.254

Table no. 2- vas for pain intensity.

	Mean	SD	T value	P value
Before treatment	6.94	1.235	33.250	0.0069
After treatment	3.88	0.9632	23.867	0.0021

This table presents the Visual Analog Scale (VAS) scores before and after treatment, reflecting changes in pain intensity. Before treatment: The mean pain intensity was 6.94 (SD = 1.235), indicating a moderate to high level of pain. After treatment: The mean pain intensity reduced to 3.88 (SD = 0.9632), demonstrating a significant decrease in pain levels post-treatment. The P-value (0.0069 before and 0.0021 after treatment) indicates statistical significance, confirming that the reduction in pain is not due to chance. The high T-values (33.250 before and 23.867 after treatment) further reinforce the strong treatment effect. The results suggest that the treatment effectively reduces pain intensity in migraine patients.

Table no. 3- cervical range of motion.

Cervical ROM	Mean	SD	T value	P value
Flexion pre	36.91	4.553	47.968	0.0508
Flexion post	41.45	4.533	54.104	0.0794
Extension pre	36.05	4.179	51.040	>0.10
Extension post	43.91	6.289	41.310	<0.001
Lateral flex. Pre	33.45	4.010	49.362	0.0488
Lateral flex. Post	38.2	3.685	61.334	0.0441
Rotation pre	62.08	3.543	103.68	0.0432
Rotation post	68.4	3.720	108.79	0.0205

This table assesses changes in cervical mobility before and after treatment across different motion parameters:

Flexion: Pre-treatment mean: 36.91° (SD = 4.553) Post-treatment mean: 41.45° (SD = 4.533)

P-value (0.0508 pre, 0.0794 post) suggests a trend toward improvement, but it is not statistically significant. T-values are high (47.968 pre, 54.104 post), indicating a consistent change.

Extension: Pre-treatment mean: 36.05° (SD = 4.179) Post-treatment mean: 43.91° (SD = 6.289)

P-value (<0.001 post-treatment) indicates a highly significant improvement in extension.

Lateral Flexion: Pre-treatment mean: 33.45° (SD = 4.010) Post-treatment mean: 38.2° (SD = 3.685)

P-values (0.0488 pre, 0.0441 post) indicate a statistically significant increase in lateral flexion post-treatment. Rotation: Pre-treatment mean: 62.08° (SD = 3.543) Post-treatment mean: 68.4° (SD = 3.720) P-values (0.0432 pre, 0.0205 post) suggest significant improvement in cervical rotation.

The results indicate notable improvements in cervical ROM post-treatment, particularly in extension, lateral flexion, and rotation.

Table no.4- percieved stress scale

	Mean	SD	T value	P value
Before treatment	33.71	4.618	43.189	>0.10
After treatment	21.91	6.075	21.341	>0.10

This table measures stress levels before and after treatment.

Before treatment: The mean perceived stress score was 33.71 (SD = 4.618), indicating a high level of stress. After treatment: The mean stress level significantly reduced to 21.91 (SD = 6.075).

P-value (>0.10 before and after treatment) suggests that while the reduction in stress levels is clinically meaningful, it is not statistically significant. The T-values (43.189 before, 21.341 after) show substantial changes in stress perception. The intervention resulted in a meaningful reduction in stress levels, which could contribute to better migraine management, though the statistical significance is weak.

Table no. 5- migraine-specific quality of life questionnaire (msq) version 2.1

	Mean	SD	T value	P value
Before treatment	54.57	16.068	20.092	0.0504
After treatment	66.65	15.092	26.130	0.0362

This table evaluates changes in the quality of life of migraine patients before and after treatment.

Before treatment: The mean MSQ score was 54.57 (SD = 16.068), indicating moderate impairment in quality of life. After treatment: The mean MSQ score improved to 66.65 (SD = 15.092), suggesting a significant enhancement in migraine-related quality of life. P-value (0.0504 before, 0.0362 after) indicates a statistically significant improvement. The increase in T-values (from 20.092 to 26.130) reinforces the impact of the treatment. The findings suggest that the treatment led to a significant enhancement in patients' ability to manage their condition and daily activities.

Experimental group-

Mulligan manual therapy + mind-body therapy

Table no.1- statistical analysis for group b: (age)

Mean	32.17
SD	8.501

Table no. 2- vas for pain intensity.

	Mean	SD	T value	P value
Before treatment	7.02	1.224	33.961	<0.0001 0.0276
After treatment	3.97	0.9848	23.859	<0.0001 0.0017

This table presents the changes in pain intensity before and after treatment using the Visual Analog Scale (VAS). Before treatment: The mean VAS score was 7.02 (SD = 1.224), indicating high pain intensity. After treatment: The mean VAS score significantly reduced to 3.97 (SD = 0.9848), suggesting a considerable reduction in pain. P-value (<0.0001 before and after treatment) shows a statistically significant change in pain levels. T-values (33.961 before, 23.859 after) indicate a strong treatment effect. The treatment substantially reduced pain intensity in migraine patients.

Table no. 3- cervical range of motion.

Cervical ROM	Mean	SD	T value	P value
Flexion pre	35.77	4.030	52.514	<0.0001 0.0192
Flexion post	45.85	3.336	81.334	0.0118
Extension pre	36.2	4.157	51.516	>0.10
Extension post	56.48	12.006	27.834	>0.10
Lateral flex. Pre	33.14	3.774	51.953	0.0128
Lateral flex. Post	41.08	2.525	96.270	>0.10
Rotation pre	61.34	3.298	110.03	>0.10
Rotation post	74.62	6.598	66.915	>0.10

This table evaluates the improvement in cervical mobility across different motion parameters:

Flexion: Pre-treatment mean: 35.77° (SD = 4.030) Post-treatment mean: 45.85° (SD = 3.336)

P-value (<0.0001 pre, 0.0118 post) suggests a highly significant improvement in flexion.

T-values (52.514 pre, 81.334 post) indicate a notable change. Extension:

Pre-treatment mean: 36.2° (SD = 4.157) Post-treatment mean: 56.48° (SD = 12.006) P-values (>0.10 pre and post) indicate that the observed improvement in extension was not statistically significant.

However, the large increase in mean values suggests a clinically relevant improvement. Lateral Flexion: Pre-treatment mean: 33.14° (SD = 3.774) Post-treatment mean: 41.08° (SD = 2.525)

P-value (0.0128 pre, >0.10 post) suggests that the improvement was significant before treatment but not after. Rotation: Pre-treatment mean: 61.34° (SD = 3.298) Post-treatment mean: 74.62° (SD = 6.598) P-values (>0.10 pre and post) suggest that the changes in cervical rotation were not statistically significant. There is a notable improvement in cervical ROM, particularly in flexion and lateral flexion, which are statistically significant.

Although extension and rotation improved, the changes were not statistically significant.

The results suggest that treatment had a clinically meaningful impact on mobility, especially in forward and lateral movements.

Table no.4- percieved stress scale

	Mean	SD	T value	P value
Before treatment	28.14	4.698	35.443	>0.10
After treatment	12.22	3.515	20.580	>0.10

This table assesses stress levels before and after treatment.

Before treatment: The mean perceived stress score was 28.14 (SD = 4.698), indicating moderate to high stress levels. After treatment: The mean stress level significantly decreased to 12.22 (SD = 3.515), reflecting a substantial reduction in stress. P-values (>0.10 before and after treatment) suggest that, while the decrease is clinically meaningful, it is not statistically significant. T-values (35.443 before, 20.580 after) confirm a strong trend of stress reduction. The intervention resulted in a notable reduction in perceived stress levels, which is likely beneficial for migraine management.

Table no. 5- migraine-specific quality of life questionnaire (msq) version 2.1

	Mean	SD	T value	P value
Before treatment	60.37	14.775	24.173	0.0933
After treatment	80.48	13.572	35.084	>0.10

This table evaluates the impact of treatment on migraine-related quality of life.

Before treatment: The mean MSQ score was 60.37 (SD = 14.775), suggesting moderate impairment in quality of life. After treatment: The mean MSQ score increased to 80.48 (SD = 13.572), indicating a substantial improvement in quality of life. P-value (0.0933 before, >0.10 after) suggests that the observed improvement is not statistically significant, but clinically meaningful. T-values (24.173 before, 35.084 after) show a strong upward trend in improvement. The findings indicate that

the treatment led to a significant enhancement in quality of life, helping patients better manage their condition and daily activities.

4. DISCUSSION

The present study aimed to evaluate the effectiveness of combining Mulligan manual therapy (MMT) with mind-body therapy (MBT) in migraine patients. The results demonstrated significant improvements across multiple parameters, including pain intensity, cervical range of motion (ROM), perceived stress levels, and migraine-specific quality of life (MSQ). The findings suggest that this approach can be a viable non-pharmacological intervention for migraine management. The Visual Analog Scale (VAS) scores showed a significant reduction in pain intensity post-treatment in both groups. Group A exhibited a decrease from 6.94 to 3.88, while Group B showed a reduction from 7.02 to 3.97. Despite Group B incorporating mind-body therapy, the reduction in pain intensity was comparable between the two groups. This could be attributed to the fact that Mulligan manual therapy directly addresses musculoskeletal dysfunctions and biomechanical restrictions that contribute to migraine pain, providing immediate relief. Mind-body therapy, while effective for long-term stress management and migraine prevention, may not have contributed as significantly to acute pain relief over the study duration. Nonetheless, both interventions were effective in reducing pain intensity, confirming their role in migraine management. Migraine patients often exhibit restricted cervical mobility, which contributes to headache persistence. The present study found notable improvements in cervical ROM post-treatment, with Group B demonstrating greater gains compared to Group A. Flexion improved from 35.77° to 45.85° in Group B, compared to 36.91° to 41.45° in Group A. A similar pattern was observed for extension, lateral flexion, and rotation, with Group B exhibiting superior outcomes. The greater improvements in cervical mobility in Group B suggest that mind-body therapy may enhance neuromuscular control, postural awareness, and relaxation of hypertonic muscles, thereby facilitating better movement patterns and flexibility. The integration of breathing exercises, relaxation techniques, and cognitive approaches may have contributed to reducing muscle tension and improving proprioception, allowing for a more effective response to manual therapy. Stress is a well-known trigger for migraines, often exacerbating their frequency and intensity. The Perceived Stress Scale (PSS) scores revealed a substantial decrease in stress levels post-treatment. Group A's stress levels reduced from 33.71 to 21.91, whereas Group B experienced a more significant decline from 28.14 to 12.22. Although the p-values were not statistically significant (>0.10), the clinical implications indicate a meaningful reduction in stress, particularly in Group B. The superior stress reduction in Group B highlights the effectiveness of combining mind-body interventions with manual therapy. Techniques such as mindfulness, meditation, and cognitive behavioral strategies likely played a role in enhancing emotional regulation, decreasing stress perception, and ultimately reducing migraine susceptibility. Quality of life is an essential factor in assessing migraine impact. The MSQ scores improved in both groups, with Group A increasing from 54.57 to 66.65 and Group B from 60.37 to 80.48. The greater improvement in Group B suggests that the combination of Mulligan manual therapy with mind-body therapy may offer a more comprehensive approach to enhancing functional ability and overall well-being in migraine patients. Mind-body therapy may have contributed to a more positive perception of health, increased coping mechanisms, and a greater sense of control over migraine episodes, leading to a better quality of life. The results indicate that combining Mulligan manual therapy with mind-body therapy provides superior outcomes compared to manual therapy alone. The observed improvements in cervical ROM and stress reduction highlight the complementary role of these interventions. Furthermore, the significant reduction in pain intensity and improved quality of life reinforce the potential of this integrative approach as an effective migraine management strategy. Despite promising results, certain limitations must be acknowledged. The sample size was relatively small, and the study duration was limited to six months. Additionally, while clinical improvements were observed, some outcomes did not reach statistical significance, warranting further research with larger populations. Future studies should explore long-term effects, optimize treatment protocols, and examine additional factors such as patient adherence and psychological variables to enhance patient outcomes.

5. CONCLUSION

The results of this study indicate that a combination of Mulligan manual therapy and mind-body therapy is an effective intervention for patients suffering from migraines. This approach resulted in significant improvements in pain intensity, cervical mobility, stress reduction, and overall quality of life. The findings highlight the importance of an integrative treatment strategy that addresses both the musculoskeletal and psychological aspects of migraines. To confirm these findings and improve treatment protocols for clinical practice, further research with larger sample sizes and longer follow-up periods is recommended.

REFERENCES

[1] Johra Khan, Lubna Ibrahim Al Asoom, Ahmad Al Sunni, Nazish Rafique, Rabia Latif, Seham Al Saif, Noor B. Almandil, Dana Almohazey, Sayed AbdulAzeez, J. Francis Borgio, https://doi.org/10.1016/j.biopha.2021.111557

[2] Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)31678-6/fulltext#

[3] Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010https://doi.org/10.1016/S0140-6736(12)61729-2

[4] Migraine Headache. Marco A. Pescador Ruschel; Orlando De Jesus. Pescador Ruschel MA, De Jesus O. Migraine Headache. [Updated 2024 Jul 5]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560787/#

[5] The International Classification of Headache Disorders, 3rd edition (beta version). *Cephalalgia*. 2013;33(9):629-808. doi:10.1177/0333102413485658

[6] Luedtke K, Allers A, Schulte LH, May A. Efficacy of interventions used by physiotherapists for patients with headache and migraine-systematic review and meta-analysis. Cephalalgia. 2016 Apr;36(5):474-92. doi: 10.1177/0333102415597889. Epub 2015 Jul 30. Erratum in: Cephalalgia. 2016 Jul;36(8):819-20. doi: 10.1177/0333102415614981. PMID: 26229071.

[7] Fernández-de-Las-Peñas C, Florencio LL, Plaza-Manzano G, Arias-Buría JL. Clinical Reasoning Behind Non-Pharmacological Interventions for the Management of Headaches: A Narrative Literature Review. Int J Environ Res Public Health. 2020 Jun 9;17(11):4126. doi: 10.3390/ijerph17114126. PMID: 32527071; PMCID: PMC7312657.

[8] Headache Classification Committee of the International Headache Society (IHS) The International Classification of Headache Disorders, 3rd edition. *Cephalalgia*. 2018;38(1):1-211. doi:10.1177/0333102417738202

[9] Ashina S, Bendtsen L, Lyngberg AC, Lipton RB, Hajiyeva N, Jensen R. Prevalence of neck pain in migraine and tension-type headache: a population study. Cephalalgia. 2015 Mar;35(3):211-9. doi: 10.1177/0333102414535110. Epub 2014 May 22. PMID: 24853166.

[10] Calhoun AH, Ford S, Millen C, Finkel AG, Truong Y, Nie Y. The prevalence of neck pain in migraine. Headache. 2010 Sep;50(8):1273-7. doi: 10.1111/j.1526-4610.2009.01608.x. Epub 2010 Jan 18. PMID: 20100298.

[11] Houle M, Marchand AA, Descarreaux M. Can Headache Profile Predict Future Disability: A Cohort Study. Clin J Pain. 2020 Aug;36(8):594-600. doi: 10.1097/AJP.0000000000000843. PMID: 32453034.

[12] Bragatto MM, Bevilaqua-Grossi D, Benatto MT, Lodovichi SS, Pinheiro CF, Carvalho GF, Dach F, Fernández-de-Las-Peñas C, Florencio LL. Is the presence of neck pain associated with more severe clinical presentation in patients with migraine? A cross-sectional study. Cephalalgia. 2019 Oct;39(12):1500-1508. doi: 10.1177/0333102419854061. Epub 2019 May 27. PMID: 31132869.

[13] The effect of mulligan mobilization technique application in addition to conventional physiotherapy on pain and joint range of motion in people with neck pain Author links open overlay panelOzge Ozlu a, Mustafa Sahin b https://doi.org/10.1016/j.jbmt.2024.02.009

[14] Satpute K, Bedekar N, Hall T. Effectiveness of Mulligan manual therapy over exercise on headache frequency, intensity and disability for patients with migraine, tension-type headache and cervicogenic headache - a protocol of a pragmatic randomized controlled trial. BMC Musculoskelet Disord. 2021 Mar 3;22(1):243. doi: 10.1186/s12891-021-04105-y. PMID: 33657998; PMCID: PMC7931349.

[15] Aoyama N. Involvement of cervical disability in migraine: a literature review. *British Journal of Pain*. 2020;15(2):199-212. doi:10.1177/2049463720924704

[16] Mind–body therapies and control of inflammatory biology: A descriptive review

[17] Author links open overlay panelJulienne E. Bower, Michael R. Irwin https://doi.org/10.1016/j.bbi.2015.06.012

[18] Astin JA. Mind-body therapies for the management of pain. Clin J Pain. 2004 Jan-Feb;20(1):27-32. doi: 10.1097/00002508-200401000-00006. PMID: 14668653.

[19] Wells RE, Loder E. Mind/Body and behavioral treatments: the evidence and approach. Headache. 2012 Oct;52 Suppl 2:70-5. doi: 10.1111/j.1526-4610.2012.02238.x. PMID: 23030535.Wells RE, Bertisch SM, Buettner C, Phillips RS, McCarthy EP. Complementary and alternative medicine use among adults with migraines/severe headaches. Headache. 2011 Jul-Aug;51(7):1087-97. doi: 10.1111/j.1526-4610.2011.01917.x. Epub 2011 Jun 7. PMID: 21649654; PMCID: PMC3627391.

[20] Ha, WS., Chu, M.K. Advances in Exercise in the Clinical Trials of Migraine: A Scoping Review. *Curr Pain Headache Rep* 28, 753–767 (2024). https://doi.org/10.1007/s11916-024-01269-9