Journal of Health and Rehabilitation Research (2791-156X)
Volume 4, Issue 3
Double Blind Peer Reviewed.
https://jhrlmc.com/
DOI: https://doi.org/10.61919/jhrr.v4i3.1588
www.lmi.education/

Assessing the Efficacy of Multimodal Therapy Alone Versus the Combination of Cognitive Behavioral Therapy Along with Multimodal Therapy in the Treatment of Chronic Low Back Pain Patients

Muhammad Mahmood Alam[1], Suriyakala Perumal Chandran[2]

Correspondence
Muhammad Mahmood Alam
rameez33@gmail.com

Affiliations
1 PhD Scholar, Department of Physical Therapy, Lincoln University College, Malaysia.
2 Associate Professor, Biochemistry and Genetics Unit, Deputy Dean, MD Pre-clinical, Faculty of Medicine, Lincoln University College, Malaysia.

Keywords
Cognitive behavioral therapy, Low back pain, Multimodal therapy.

Disclaimers

Authors' Contributions	Both authors contributed to the design, data analysis, and manuscript preparation.
Conflict of Interest	None declared
Data/supplements	Available on request.
Funding	None
Ethical Approval	Respective Ethical Review Board
Study Registration	N/A
Acknowledgments	N/A

ABSTRACT

Background: Chronic Low Back Pain (CLBP) is a major public health concern worldwide, significantly impacting individuals' quality of life and contributing to disability and economic burdens. Traditional treatments often focus on physical aspects, but integrating Cognitive Behavioural Therapy (CBT) with Multimodal Therapy (MMT) has shown promise in addressing both the physical and psychological aspects of CLBP.

Objective: This study aims to compare the effectiveness of MMT alone versus MMT combined with CBT in improving pain, functional ability, and disability levels among CLBP patients.

Methods: A randomized controlled trial was conducted involving male and female participants diagnosed with CLBP. Participants were divided into two groups: one receiving MMT alone and the other receiving MMT combined with CBT. Outcomes were measured using the Knee to Side Bend Test (KSTB), Numeric Pain Rating Scale (NPRS), and Modified Oswestry Disability Index (MODI) before and after the interventions. The study included a total of 108 participants (54 males and 54 females). Statistical analysis was performed to assess between-group and within-group differences.

Results: The findings revealed that the group receiving MMT combined with CBT showed significantly greater improvements across all measured outcomes compared to the MMT alone group. Specifically, participants in the MMT with CBT group exhibited a more substantial reduction in pain levels (NPRS), greater improvements in functional ability (KSTB), and a more pronounced decrease in disability levels (MODI). The differences between the groups were statistically significant ($p < 0.001$), indicating that the addition of CBT to MMT enhances the treatment's effectiveness.

Conclusion: The study concludes that integrating CBT with MMT is more effective in managing CLBP than MMT alone. The combined approach addresses both the physical and psychological aspects of chronic pain, leading to better overall patient outcomes. These findings support the adoption of a multidisciplinary approach in the treatment of CLBP, particularly for patients with persistent pain. Further research is recommended to explore the long-term benefits and cost-effectiveness of this combined therapy.

INTRODUCTION

Low back pain (LBP) is one of the leading public health concerns globally, contributing significantly to disability and limiting participation in regular work activities and socialization (1). According to the World Health Organization (WHO), an estimated 619 million people are suffering from low back pain worldwide. It is one of the major public health issues associated with a loss of work productivity and contributes substantially to the economic and sickness burden in societies (2). While there is limited scientific evidence on the exact prevalence of LBP, in 2017, age-related LBP was ranked 9th in terms of health burden, producing disability with a prevalence rate of 7.50% globally (3). Furthermore, a cross-sectional and cohort study review article in 2015 reported a 19.6% prevalence rate among individuals aged between 20 to 59 years. However, in 2018, the prevalence rate of chronic LBP among patients in the UK was reported to be between 10% and 15% (4).

Over time, a better understanding of pain mechanisms was achieved through major global research efforts, including the development of the first model, which proposed pain as comparable to nociceptive input. This was followed by the gate theory, presented by Wall and Melzack, and more recently, the concept of central sensitization (CS), representing pain as a complex phenomenon involving both

Manuscript Submitted under JHRR ID 1588: September12/2024 | Accepted: September 28/2024

central nervous system (CNS) sensitization and maladaptive responses in chronic pain patients, such as those with whiplash injuries (5). Inverse relationships have been found between pain reports and cognitive capacity in numerous studies, affecting cognitive domains such as episodic memory, executive function, attention, and processing speed (6).

Several studies have associated symptoms of central sensitization, such as pain catastrophizing, substance abuse, psychosis, anxiety, depression, and insomnia, with maladaptive pain behaviors, highlighting their role in emotional sensitization (7). Cognitive Behavioral Therapy (CBT) addresses the complex interaction of psychological factors involved in chronic pain. By guiding individuals to manage maladaptive thinking and adopt effective coping strategies, CBT offers a comprehensive, patient-centered approach to chronic low back pain (CLBP), promoting long-term resilience and improved well-being (8).

A separate study evaluated the relative effectiveness of Mindfulness-Based Cognitive Therapy (MBCT) and Cognitive Behavioral Therapy (CBT), finding notable improvements in the subjective quality of life for those in the MBCT group, and in sleep duration, quality, and adequacy for the CBT group. Both therapies demonstrated similar effectiveness overall, though MBCT tended to show larger effect sizes. Additionally, CBT seemed to primarily benefit sleep-related factors, whereas MBCT was linked to improvements in pain management and overall quality of life (9). Another study compared the impact of Cognitive Behavioral Therapy (CBT) and core stabilization exercises (CSE) on pain-related disability, psychological well-being, and sleep disturbances in patients with non-specific chronic low back pain (NSCLBP). The results indicated that both CBT and CSE were effective in improving pain-related disability, psychological status, and sleep disturbances in individuals with NSCLBP (10).

Outcome measures, such as the Oswestry Disability Index, Tampa Scale for Kinesiophobia, Pain Catastrophizing Scale, pain intensity, and Short-Form Health Survey, were assessed prior to treatment, 10 weeks post-treatment, and 12 months afterward. The analysis showed significant effects based on group, time, and the interaction between time and group for all measured outcomes. The experimental group showed greater improvements, with significant differences between groups in terms of disability, kinesiophobia, catastrophizing, and pain levels. The multimodal intervention, which combined task-oriented exercises and CBT, proved more effective than standard physiotherapy in reducing disability, kinesiophobia, and catastrophizing, while also improving the quality of life in patients with failed back surgery syndrome (FBSS). The study underscores the value of an integrated rehabilitation approach and emphasizes the critical roles of physiotherapists and psychologists in promoting functional recovery and addressing maladaptive beliefs in FBSS patients (11).

To illustrate the integration of Cognitive Behavioral Therapy (CBT) techniques into multimodal care, a physical therapist applied these strategies to a 70-year-old woman with persistent low back pain. The CBT methods used included cognitive restructuring, goal setting, activity pacing, problem-solving, graded exposure, encouraging enjoyable activities, and implementing maintenance strategies. After seven visits over 21 weeks, the patient experienced significant progress, including a 10% decrease in her Oswestry Disability Questionnaire score, a 48% reduction in the Fear-Avoidance Belief Questionnaire physical activity subscale score, and improved scores on the Low Back Activity Confidence Scale. This case report suggests that incorporating CBT into physical therapy may lead to measurable improvements in disability and self-efficacy, though additional research is needed to establish best practices for CBT-based education by physical therapists (12).

To assess the effectiveness of cognitive behavioral group therapy for back pain (CBT-BP) in enhancing pain tolerance, reducing disability, and addressing somatization in individuals with chronic back pain, 53 participants received six CBT-BP sessions, while 50 participants in the control group underwent non-specific occupational therapy. The results demonstrated significant improvements over time in several measures, including the Symptom Checklist (SCL-90), Health Locus of Control Ratings, Fear Avoidance Beliefs Questionnaire (FABQS), and Visual Analogue Pain Scale (VAS-pain) for both groups. However, the intervention group showed significantly greater improvements in VAS-pain and FABQS compared to the control group, although no substantial differences were found in the SCL. These findings suggest that cognitive behavioral group therapy has a specific treatment effect beyond the benefits of standard multimodal inpatient care, directly influencing pain perception and adding to the evidence supporting this therapeutic approach (13).

To evaluate the effectiveness, cost-effectiveness, and influence of patient preference on outcomes for individuals with persistent disabling low back pain (LBP), participants were randomized into two groups. One group participated in a 6-week program combining exercise and education with a cognitive behavioral therapy (CBT) approach, while the other received an educational booklet and audio cassette. The results indicated that the intervention produced a small, non-significant reduction in pain (-3.6 mm) and disability (-0.6 score). The study concluded that the program had modest effects over a 1-year period, highlighting the need for further research into how patient treatment preferences impact outcomes (14).

The study by Ólason et al. (2018) aimed to explore the long-term effects of Cognitive Behavioral Therapy (CBT) on depression and anxiety in individuals with chronic musculoskeletal pain. A total of 115 participants took part in an interdisciplinary pain management program, with 80 receiving CBT alongside rehabilitation pain management, while 35 formed the comparison group. The results revealed significant improvements in the CBT group, which were maintained at the 3-year follow-up, unlike the comparison group. Additionally, employment rates increased in the CBT group during the follow-up period. The findings suggest that incorporating CBT into rehabilitation pain management

programs can provide lasting benefits, with important clinical and economic implications (15).

The study by Bergström et al. (2012) aimed to evaluate the effect of treatment content on sickness absence over a 10-year period in individuals with chronic neck pain (NP) and/or low back pain (LBP), considering subgroups based on the Swedish version of the Multidimensional Pain Inventory (MPI-S). This randomized controlled multicenter trial involved 214 participants who received either Behavioral-oriented Physiotherapy (PT), Cognitive Behavioral Therapy (CBT), Behavioral Medicine Rehabilitation (BM), or participated in a "treatment-as-usual" control group (CG). The results indicated a potential difference in sickness absence trends for the adaptive coper (AC) subgroup, which responded most favorably to the multidisciplinary program compared to the CG, although these results did not achieve statistical significance. In contrast, interpersonally distressed (ID) and dysfunctional (DYS) patients exhibited similar patterns of sickness absence across all interventions and the CG. Overall, the multidisciplinary program seemed most beneficial for DYS and AC patients in the long-term follow-up regarding sickness absence, while CBT and PT interventions did not significantly benefit any patient group (16).

MATERIAL AND METHODS

A randomized controlled trial was conducted at the Akhtar Saeed Clinic of Physical Therapy in Lahore, Pakistan, to compare the effectiveness of Multimodal Therapy (MMT) alone versus MMT combined with Cognitive Behavioral Therapy (CBT) in treating chronic low back pain (CLBP). Participants included adult male and female patients aged 18 years and older who were experiencing non-specific CLBP for more than three months. The eligibility of potential participants was determined using the Keele STarT Back Screening Tool, a validated instrument for stratifying low back pain patients based on their risk of chronicity (17). Patients classified as having a moderate risk of developing long-term disability were recruited for the study. Individuals were excluded if they presented with severe spinal pathologies, such as fractures, cancer, infections, inflammatory diseases, canal stenosis, or cauda equina syndrome, or if they had received surgical treatment for their condition within the past year.

Eligible participants were randomly allocated to one of two intervention groups using a computer-generated randomization sequence to ensure allocation concealment. Group A received MMT alone, while Group B received MMT combined with CBT. Randomization was stratified by gender to ensure balanced representation of male and female participants in each group. The final sample consisted of 108 participants, with 54 males and 54 females evenly distributed between the two groups. The interventions were provided by experienced physiotherapists trained in multimodal therapy techniques and CBT principles.

Before the commencement of the study, all participants provided written informed consent, and the study protocol was approved by the institutional review board in accordance with the ethical standards of the Declaration of Helsinki.

The intervention for Group A consisted solely of Multimodal Therapy (MMT), which included a combination of manual therapy, therapeutic exercises, and pain management strategies aimed at addressing the physical components of chronic low back pain. This approach was designed to improve flexibility, reduce muscle tension, and enhance functional mobility. The MMT sessions were administered twice weekly for eight weeks, with each session lasting approximately 60 minutes. Group B received the same MMT intervention along with an adjunctive Cognitive Behavioral Therapy (CBT) component. The CBT component was integrated into the MMT sessions and included strategies such as cognitive restructuring, graded exposure, and problem-solving techniques to address maladaptive pain beliefs, reduce fear-avoidance behavior, and promote better pain coping mechanisms. The CBT sessions were conducted by trained therapists using a standardized protocol to ensure consistency across participants. Each CBT session lasted 30 minutes and was delivered immediately after the MMT session, making the total treatment duration 90 minutes per session for Group B.

Data collection was carried out by blinded assessors who were not involved in the treatment delivery to minimize bias. Baseline data were obtained using a comprehensive assessment form, which included demographic information, medical history, and baseline values for the outcome measures. The primary outcome measures used in this study included the Knee to Side Bend Test (KSTB) for assessing flexibility, the Numeric Pain Rating Scale (NPRS) for pain intensity, and the Modified Oswestry Disability Index (MODI) for evaluating disability levels. All assessments were performed at baseline and at the end of the eight-week intervention period.

Data were entered and analyzed using SPSS version 25.0. Descriptive statistics were calculated to summarize demographic characteristics and baseline outcome measures for each group. Continuous variables, such as KSTB, NPRS, and MODI scores, were expressed as mean ± standard deviation (SD). Inferential statistics were employed to assess within-group and between-group differences. Paired sample t-tests were used to evaluate pre- and post-treatment differences within each group. Independent sample t-tests were used to compare the mean differences between the two groups. A p-value of less than 0.05 was considered statistically significant. Effect sizes were also calculated to determine the magnitude of treatment effects for each outcome measure.

Throughout the study, ethical considerations were strictly adhered to. Participants were fully informed about the nature of the study, potential risks, and benefits before obtaining their consent. The study protocol was developed in compliance with the ethical guidelines of the Declaration of Helsinki. Data confidentiality and participant anonymity were maintained throughout the research process. In cases where participants required additional medical attention outside the scope of the study, appropriate referrals were

made to ensure their well-being. The findings of this study were documented with transparency, ensuring the validity and reproducibility of the research outcomes.

Overall, the study was designed to rigorously evaluate the efficacy of combining CBT with MMT for managing chronic low back pain, offering insights into the potential benefits of integrating psychological interventions with standard physiotherapy practices. Further research is warranted to explore the long-term effects and cost-effectiveness of this combined therapeutic approach, as well as to identify patient subgroups that may benefit most from this integrated model of care.

RESULTS

The results presented in **Table 1** offer a comprehensive view of the comparative efficacy of Multimodal Therapy (MMT) alone versus MMT combined with Cognitive Behavioral Therapy (CBT) on various outcome measures, specifically the Knee to Side Bend Test (KSTB), Numeric Pain Rating Scale (NPRS), and the Modified Oswestry Disability Index (MODI). The table highlights the performance of each group, stratified by gender, at pre-treatment and post-treatment stages, providing insight into the magnitude of improvement in male and female participants separately.

In terms of flexibility, as measured by the Knee to Side Bend Test (KSTB), the mean scores for males in the MMT alone group decreased from 6.16 ± 1.70 to 3.12 ± 0.88, indicating a moderate improvement in flexibility following treatment. However, the addition of CBT to MMT produced more pronounced improvements, with the mean KSTB score for males decreasing from 6.46 ± 1.99 to 1.21 ± 0.57, representing a significant reduction. For female participants, a similar trend was observed: the mean KSTB scores in the MMT group dropped from 6.28 ± 1.22 to 2.72 ± 1.07, while the MMT combined with CBT group demonstrated a more substantial reduction from 6.62 ± 1.36 to 1.42 ± 0.70. These findings suggest that the integration of CBT with MMT effectively enhanced flexibility in both male and female participants, with the post-treatment KSTB values in the MMT with CBT group being significantly lower than those in the MMT group alone.

Regarding pain intensity, measured by the Numeric Pain Rating Scale (NPRS), a notable reduction was seen in both groups; however, the MMT with CBT group showed a superior decrease in pain levels. For males, the mean NPRS score dropped from 7.00 ± 1.32 pre-treatment to 4.36 ± 1.68 post-treatment in the MMT group. Conversely, males in the MMT with CBT group experienced a larger reduction from 6.75 ± 1.40 to 2.50 ± 1.20. Similarly, females in the MMT group had a mean NPRS decrease from 6.72 ± 1.25 to 3.97 ± 1.40, while the MMT with CBT group exhibited a more profound reduction from 7.19 ± 1.70 to 2.88 ± 1.31. This indicates that the psychological component added by CBT contributed to a significantly greater pain relief in both genders compared to MMT alone.

The results for disability levels, as assessed by the Modified Oswestry Disability Index (MODI), align with the trends observed in pain intensity and flexibility. Male participants in the MMT group showed a decrease in MODI scores from 31.68 ± 7.17 to 22.40 ± 4.74, while those in the MMT with CBT group exhibited a substantial reduction from 33.32 ± 6.35 to 13.39 ± 4.51. Similarly, female participants in the MMT group experienced a decrease in MODI scores from 31.97 ± 6.63 to 23.83 ± 6.13, compared to the more pronounced reduction in the MMT with CBT group from 31.31 ± 5.88 to 16.96 ± 5.57. This suggests that the addition of CBT significantly improved functional outcomes and reduced disability levels in both male and female participants.

Table 2 presents a detailed comparison of the differences in KSTB, NPRS, and MODI scores between and within groups for both male and female participants, illustrating the impact of adding CBT to MMT. Each outcome measure was evaluated in terms of the mean pre- and post-treatment differences, alongside statistical significance values for between-group and within-group differences.

Table 1: Descriptive Statistics for KSTB, NPRS, and MODI in Male and Female Participants

Outcome Measure	Time Point	Group	Male N	Male Mean ± SD	Female N	Female Mean ± SD
KSTB	Pre	MMT	25	6.16 ± 1.70	29	6.28 ± 1.22
		MMT with CBT	28	6.46 ± 1.99	26	6.62 ± 1.36
	Post	MMT	25	3.12 ± 0.88	29	2.72 ± 1.07
		MMT with CBT	28	1.21 ± 0.57	26	1.42 ± 0.70
NPRS	Pre	MMT	25	7.00 ± 1.32	29	6.72 ± 1.25
		MMT with CBT	28	6.75 ± 1.40	26	7.19 ± 1.70
	Post	MMT	25	4.36 ± 1.68	29	3.97 ± 1.40
		MMT with CBT	28	2.50 ± 1.20	26	2.88 ± 1.31
MODI	Pre	MMT	25	31.68 ± 7.17	29	31.97 ± 6.63
		MMT with CBT	28	33.32 ± 6.35	26	31.31 ± 5.88
	Post	MMT	25	22.40 ± 4.74	29	23.83 ± 6.13
		MMT with CBT	28	13.39 ± 4.51	26	16.96 ± 5.57

For the Knee to Side Bend Test (KSTB), the pre- and post-treatment differences in the MMT group were 3.04 ± 1.67 for males and 3.35 ± 1.84 for females,demonstrating moderate improvement.

In contrast, the MMT with CBT group showed a significantly larger improvement, with mean differences of 5.27 ± 2.17 for males and 5.19 ± 1.60 for females.The between-group differences were statistically significant ($p < 0.001$),

indicating that adding CBT to MMT resulted in a significantly greater enhancement of flexibility.

Similarly, for the NPRS, the MMT group's mean difference was 2.64 ± 1.99 for males and 2.75 ± 2.16 for females, reflecting some reduction in pain levels. However, the MMT with CBT group exhibited a more substantial reduction, with mean differences of 4.25 ± 1.85 for males and 4.30 ± 2.11 for females.

These within-group and between-group differences were also statistically significant ($p < 0.001$), underscoring the superior efficacy of MMT combined with CBT in alleviating pain intensity.

Table 2: Comparison of Within-Group and Between-Group Differences in KSTB, NPRS, and MODI for Males and Females

Variable	Group	Males (Mean ± SD)	Females (Mean ± SD)	Between-Group Difference	Within-Group Difference
Pre KSTB - Post KSTB	MMT	3.04 ± 1.67	3.35 ± 1.84	< 0.001	< 0.001
	MMT with CBT	5.27 ± 2.17	5.19 ± 1.60	< 0.001	< 0.001
Pre NPRS - Post NPRS	MMT	2.64 ± 1.99	2.75 ± 2.16	< 0.001	< 0.001
	MMT with CBT	4.25 ± 1.85	4.30 ± 2.11	< 0.001	< 0.001
Pre MODI - Post MODI	MMT	9.28 ± 10.09	8.13 ± 8.08	< 0.001	< 0.001
	MMT with CBT	19.92 ± 7.96	14.34 ± 6.22	< 0.001	< 0.001

The Modified Oswestry Disability Index (MODI) scores revealed similar patterns. The MMT group showed a decrease of 9.28 ± 10.09 for males and 8.13 ± 8.08 for females. Meanwhile, the MMT with CBT group demonstrated a significantly greater reduction of 19.92 ± 7.96 for males and 14.34 ± 6.22 for females. The between-group and within-group differences were highly significant ($p < 0.001$), indicating that integrating CBT with MMT was far more effective in reducing disability associated with chronic low back pain.

Overall, these results suggest that the addition of Cognitive Behavioral Therapy (CBT) to Multimodal Therapy (MMT) offers a significant advantage over MMT alone in treating chronic low back pain (CLBP) in both male and female participants. The combined approach not only improved flexibility and reduced pain intensity but also markedly decreased disability levels. The findings support the integration of psychological therapies like CBT into physical therapy interventions to achieve better functional outcomes and pain management in CLBP patients.

DISCUSSION

The findings of this study show that integrating Cognitive Behavioral Therapy (CBT) with Multimodal therapy (MMT) significantly improves outcomes in the treatment of Chronic Low Back Pain (CLBP). The NPRS scores for males and females in the MMT with CBT group decreased significantly more than in the MMT group. For males, the pre-treatment NPRS was (6.75 ± 1.40), which reduced to (2.50 ± 1.20) post-treatment. In comparison, the MMT group saw a decrease from (7.00 ± 1.32 to 4.36 ± 1.68). For females, the NPRS decreased from (7.19 ± 1.70 to 2.88 ± 1.31) in the MMT with CBT group, while in the MMT group, it decreased from (6.72 ± 1.25 to 3.97 ± 1.40). The within-group and between-group differences in NPRS scores were statistically significant, with a p-value of (<0.001). Similarly, KSTB scores also showed substantial improvement in the MMT with CBT group compared to the MMT group. The KSTB score for males in the MMT with CBT group decreased from (6.46 ± 1.99 to 1.21 ± 0.57) and from (6.16 ± 1.70 to 3.12 ± 0.88) in the MMT group. For females, the KSTB score decreased from (6.62 ± 1.36 to 1.42 ± 0.70) in the MMT with CBT group, and from (6.28 ± 1.22 to 2.72 ± 1.07) in the MMT group. The differences in KSTB scores were also significant ($p < 0.001$).

In terms of disability (MODI), both male and female participants in the MMT with CBT group experienced greater reductions in disability levels. Males showed a decrease in MODI scores from (33.32 ± 6.35 to 13.39 ± 4.51), whereas the MMT group showed a decrease from (31.68 ± 7.17 to 22.40 ± 4.74). For females, the MODI score reduced from (31.31 ± 5.88 to 16.96 ± 5.57) in the MMT with CBT group, while in the MMT group, the decrease was from (31.97 ± 6.63 to 23.83 ± 6.13). The between-group and within-group differences for MODI were highly significant ($p < 0.001$). These findings support the bio-psychosocial model of pain, which underscores the importance of addressing both physical and psychological factors in pain management. Previous research aligns with these findings, indicating that CBT helps modify pain perceptions and coping strategies, resulting in reduced fear-avoidance behaviors and improved functional capacity. Hofmann et al. (2012) demonstrated that CBT reduces pain intensity and improves the quality of life for patients with chronic pain, including CLBP (17). In the same way, Williams et al. (2012) found that integrating CBT with standard physiotherapy led to significantly better outcomes in terms of disability reduction and functional improvement compared to physiotherapy alone (18). These findings suggest that CBT, when added to MMT, plays a pivotal role in improving both physical and psychological aspects of chronic pain, leading to better overall treatment outcomes. This multidisciplinary approach aligns with clinical guidelines that advocate for holistic treatments addressing the physical and psychological factors contributing to chronic pain, such as the National Institute for Health and Care Excellence (NICE) guidelines.

However, additional research with larger sample sizes and extended follow-up periods is necessary to validate the long-term effectiveness of combining Cognitive Behavioral Therapy (CBT) with multimodal treatment (MMT). Future studies should also investigate the cost-effectiveness of this integrated approach and identify which specific components of CBT provide the greatest benefit in

improving physical therapy outcomes. Overall, this study underscores the significance of a comprehensive bio-psychosocial approach in managing chronic low back pain (CLBP), highlighting the synergistic effects of integrating psychological and physical therapies.

CONCLUSION

In conclusion, the findings of this study strongly support the integration of CBT with MMT in the treatment of CLBP. The combined approach leads to greater improvements in pain reduction, functional ability, and disability levels compared to MMT alone. This multidisciplinary approach should be considered as a standard treatment protocol for CLBP, as it addresses both the physical and psychological aspects of chronic pain, leading to better patient outcomes. Further research is needed to explore the long-term effects and cost-effectiveness of this combined therapy.

REFERENCES

1. Abbasi-Kangevari, M., et al. (2022). "Quality of care of peptic ulcer disease worldwide: A systematic analysis for the global burden of disease study 1990–2019." PloS one 17(8): e0271284.
2. Airaksinen, O., et al. (2006). "European guidelines for the management of chronic nonspecific low back pain." European spine journal 15(Suppl 2): s192.
3. Aneis, M., et al. (2021). "Efect of cognitive behavior therapy in patients with chronic nonspecific low back pain." Turkish Journal of Physiotherapy and Rehabilitation 32: 3.
4. Ang, D. C., et al. (2010). "Cognitive–behavioral therapy attenuates nociceptive responding in patients with fibromyalgia: a pilot study." Arthritis care & research 62(5): 618-623.
5. Balagué, F., et al. (2012). "Non-specific low back pain." The lancet 379(9814): 482- 491.
6. Beck, A. T. (1979). Cognitive therapy of depression, Guilford press.
7. Beck, J. (1995). "Cognitive therapy: Basics and beyond. New York: Guilford."
8. Hanscom, D. A., Brox, J. I., & Bunnage, R. (2015). Defining the role of cognitive behavioral therapy in treating chronic low back pain: an overview. Global Spine Journal, 5(6), 496-504.
9. Pardos-Gascón, E. M., Narambuena, L., Leal-Costa, C., Ramos-Morcillo, A. J., Ruzafa-Martínez, M., & van-der Hofstadt Román, C. J. (2021). Psychological therapy in chronic pain: differential efficacy between mindfulness-based cognitive therapy and cognitive behavioral therapy. Journal of Clinical Medicine, 10(16), 3544.
10. Akodu, A. K., Ogunbiyi, T. A., & Fapojuwo, O. A. (2020). Cognitive behavioural therapy and core stabilization exercise on pain-related disability and psychological status in patients with non-specific chronic low back pain.
11. Monticone, M., Ambrosini, E., Rocca, B., Cazzaniga, D., Liquori, V., Lovi, A., & Brayda-Bruno, M. (2020). Multimodal exercises integrated with cognitivebehavioural therapy improve disability of patients with failed back surgery syndrome: a randomized controlled trial with one-year follow-up. Disability and Rehabilitation, 1, 1-8.
12. Rundell, S. D., & Davenport, T. E. (2010). Patient education based on principles of cognitive behavioral therapy for a patient with persistent low back pain: a case report. journal of orthopaedic & sports physical therapy, 40(8), 494-501.
13. Linden, M., Scherbe, S., & Cicholas, B. (2014). Randomized controlled trial on the effectiveness of cognitive behavior group therapy in chronic back pain patients. Journal of Back and Musculoskeletal Rehabilitation, 27(4), 563-568.
14. Johnson, R. E., Jones, G. T., Wiles, N. J., Chaddock, C., Potter, R. G., Roberts, C., ... & Macfarlane, G. J. (2007). Active exercise, education, and cognitive behavioral therapy for persistent disabling low back pain: a randomized controlled trial.
15. Ólason, M., Andrason, R. H., Jónsdóttir, I. H., Kristbergsdóttir, H., & Jensen, M. P. (2018). Cognitive behavioral therapy for depression and anxiety in an 152 interdisciplinary rehabilitation program for chronic pain: A randomized controlled trial with a 3-year follow-up. International journal of behavioral medicine, 25, 55-66.
16. Bergström, C., Jensen, I., Hagberg, J., Busch, H., & Bergström, G. (2012). Effectiveness of different interventions using a psychosocial subgroup assignment in chronic neck and back pain patients: a 10-year follow-up. Disability and rehabilitation, 34(2), 110-118.
17. Hofmann, S. G., Asnaani, A., Vonk, I. J., Sawyer, A. T., & Fang, A. (2012). The efficacy of cognitive behavioral therapy: A review of meta-analyses. Cognitive therapy and research, 36, 427-440.
18. de C Williams, A. C., Fisher, E., Hearn, L., & Eccleston, C. (2020). Psychological therapies for the management of chronic pain (excluding headache) in adults. Cochrane database of systematic reviews, (8).