

Effect of Mindfulness Meditation as an Adjunctive Medium to Occupational Therapy Practice in Alleviating Low Back Pain

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Abstract: **Aim And Objectives:** To address all elements of a person's health and wellbeing and to integrate the physical, cognitive, and psychological components for pain management. **Methodology:** The research was a Randomized control Trial Experimental based research and the Simple non probability sampling method was used. The Oswestry Low back pain disability Questionnaire and Visual Analogue scales were used as tools and 60 Patients (In and Out) with Low back pain from the SRM University Medical and Research Hospital, Kattankulathur were selected. After completion of 32 sessions, Oswestry Low back pain disability questionnaire and Visual analogue scale were administered to all participants to determine the post-test performance. This enables comparison between pre and post-test performance of the patient. Data was analyzed using SPSS (version 21.0) for windows and excel sheet. **Results:** The outcome of this study illustrates the effectiveness of mindfulness meditation in low back pain reduction among patients of various groups. Statistical analysis with reference to chi-square, inferential statistic and P-Value show improvement among the 30 experimental groups based on Oswestry low back pain disability questionnaire which was used to determine the outcome measure. **IN Conclusion:** The study suggests that mindfulness-meditation (MM) is an effective treatment option for patients with chronic low back pain, Along with previous studies, "It is believed that there is enough evidence...to say that MM is a reasonable treatment option," for patients living with low back pain to start engaging in, "It is relatively safe and may improve people's life beyond just back pain."

Keywords: Meditation, Low Back Pain, Adjunctive Medium, Occupational Therapy

1. Introduction

Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Pain is thus more than merely the firing of **nociceptive** neurons, but also includes the perception of pain, the experience of suffering, and pain behavior. The perception of pain may depend on the situation or mental state, such as when soldiers on the battlefield or athletes on the playing field do not feel pain when injured. In contrast, a person with posttraumatic stress disorder (PTSD) may experience significant pain without any physical stimulus. Some people experience suffering, or the affective experience of distress, with minimal tissue damage, whereas other people may have significant tissue damage and pain with minimal experience of suffering. (B. O'Sullivan, J. Schmitz et-al)[1]. Pain is the most common reason why people visit health care providers and physical therapists. **Chronic pain** affects about 116 million Americans, accounting for up to 20% of all primary care visits in the United States; low back pain (LBP) is the second most common reason for physician visits. Chronic pain affects more people than diabetes, heart disease, and cancer combined. Up to 26% of American adults have had pain for more than 3 months, and one-third of those report that this

pain is disabling. Internationally, chronic pain affects up to 35% of adults and 25% of children; chronic pain is almost twice as prevalent in women compared to men. Spinal pain, headache, and arthritis are the most common sources of chronic pain: LBP affects 28%, headache and migraine affect 16%, neck pain affects 15%, and combined peripheral joint pain affects 30% of Americans. Other conditions such as stroke, spinal cord injury (SCI), diabetes, multiple sclerosis (MS), HIV/AIDS, amputation, Guillain-Barré syndrome, cancer, and a variety of other conditions can also lead to chronic pain. Holger Cramer et-al 2012 Stated that Low back pain (LBP) has become one of the most influential musculoskeletal diseases of the modern society. It is the second most common pain complaint among the adult population [2]. Approximately, 3% to 7% of the population in the western industrialized countries experience LBP. Fear of the etiology of pain, the interventions, and social consequences of pain can be harmful to the clients. The incidence of low back pain is influenced by occupation; individuals employed in jobs that involve heavy physical work and lifting are more susceptible to low back pain.

The most common causes of LBP are injury, (e.g. lifting) and stress, resulting in musculoskeletal and neurologic disorders. Back pain may also result from infections, degenerative diseases (e.g. osteoarthritis), rheumatoid arthritis, spinal

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stenosis, tumors and congenital disorders. LBP may improve spontaneously over time. With low back pain, functional restoration is key. Medical management, physical therapy (e.g. exercise, massage, traction) and self-care Education are common treatment approaches. Once significant back pain has lasted for more than 6 months, however, the chance that the affected individual will return to work is 50%. Pain may be experienced in several ways:

- **Localized:** In localized pain the patient will feel soreness or discomfort when the doctor palpates, or presses on, a specific surface area of the lower back.
- **Diffused:** Diffuse pain is spread over a larger area and comes from deep tissue layers.
- **Radicular:** The pain is caused by irritation of a nerve root. Sciatica is an example of radicular pain.
- **Referred:** The pain is perceived in the lower back but is caused by inflammation elsewhere, often in the kidneys or lower abdomen.

Few cases of Low back pain are due to specific causes; most cases are not specific. Acute low back pain is the most common presentation and is usually self-limiting, lasting less than 3 months regardless of treatment. Chronic low back pain is a more difficult problem, which not often has strong psychological overlay: work dissatisfaction, boredom and a generous compensation system contribute to it. Back pain is described by the length of time symptoms persist:

- Acute LBP lasts less than 6 weeks.
- Sub-acute LBP lasts between 6 and 12 weeks.
- Chronic LBP persists for more than 12 weeks

Acute and sub-acute low back pain: Ehrlich GE, Khaltaev NG in their study discovered that minority of cases of low back pain result from physical causes[3]. Trauma to the back caused by a motor vehicle crash or a fall among young people and lesser traumas, osteoporosis with fractures, or prolonged corticosteroid use among older people are antecedents to back pain of known origin in most instances. Relatively less common vertebral infections and tumors or their metastases account for most of the remainder. Specific causes account for less than 20% of cases of back pain: the probability that a particular case of back pain has a specific cause is only 0.2%.

Croft P, Rigby AS, Boswell R, Schollum J, Silman A noted that non-specific low back pain is thus a major problem for diagnosis and treatment[4]. Studies in the United Kingdom identified low back pain as the most common cause of disability in young adults. The treatment of acute nonspecific low back pain of rapid onset is typically with simple pain medications and the continuation of as much normal activity as the pain allows. Surgery may be beneficial for those with disc related chronic pain and disability of spinal stenosis. Low back pain affects mood, which may be improved by counseling or antidepressants. Additionally, there are many alternate therapies, including Alexander technique and Mindfulness Meditation. Low back pain can be broadly classified into four main categories:

- **Musculoskeletal-** mechanical (including muscle strain, muscle spasm or osteoarthritis); herniated nucleus pulposus, herniated disk, spinal stenosis; or compression fractures.

- **Malignancy-** bone metastasis from lung, breast, prostate, thyroid, among others.
- **Infectious-** osteomyelitis; abscess.

Chronic Low Back Pain: Hadler NM, Lippincott Williams & Wilkins; 2000 observed that Psychological factors are even more important in people with chronic low back pain [5]. Dissatisfaction with a work situation, a supervisor, or a dead end job and boredom contribute greatly to the onset and persistence of back pain. Under the WHO classification, back pain would be considered a disability, and the social, design and architectural barriers would be its handicaps (International classification of impairments, disabilities, and handicaps. Geneva: World Health Organization; 1980). Other activities often blamed are weight, lumbar lordosis, height, body mass index and discrepancy between leg lengths may not play a major role. Disc herniation and spinal canal narrowing are so common as to be shown by imaging in most of the population in their later years, and in most cases, such conditions are not responsible for the pain. They often are cited as reasons for surgery, but only rarely are operations successful in alleviating the pain the pain definitely.

Mindfulness Meditation: Ludwig & Kabat-zinn, 2008 describes Mindfulness meditation as a practice of cultivating awareness of the present moment and observing one's internal state in a non-judgmental, non-reactive manner. The goal of mindfulness meditation is to "maintain awareness moment by moment, disengaging oneself from strong attachment to beliefs, thoughts, or emotions, and thereby developing a greater sense of emotional balance and well-being.

Creswell, May, Eisenberger & Lieberman, 2007; Farb et al, 2007; Tang et al, 2007 have found that mindfulness meditation affects area in the brain responsible for regulating attention, awareness and emotion. Having capacity to use one's mind to change their brain suggests neuroplasticity is a mechanism of change in meditation. Occupational therapists can help clients develop a mindfulness plan that is practical and realistic. Research about habit formation of health behaviors suggests that a common obstacle to developing habits is unrealistic plans. Many mindfulness practitioners recommend meditating for at least 20 minutes each day, and a client may even agree to this. However, if he or she doesn't realistically have the time or motivation to do it regularly, the practice will not be sustained [6].

Current Evidence: Creswell, May, Eisenberger, & Lieberman, 2007; Farb et al., 2007; Tang et al., 2007 compared MM to relaxation techniques, meditation has been shown to be more effective in diminishing stress reactivity by developing an increased ability to regulate and appraise distress. Studies have found that MM affects areas in the brain responsible for regulating attention, awareness and emotion (Having capacity to use one's mind to change their brain suggests neuroplasticity is a mechanism of change in meditation[7]. Safren, Sprich, Cooper-Vince, Knouse, & Lerner, 2010; Wilens, Biederman, & Spencer, 1998; Wilens, Spencer, & Biederman, 2002) added that, in clinical practice

some patients desire to minimize use of medications, and seek alternative or complementary/compensatory approaches. The aim of this review is to (a) provide a rationale for the application of mindfulness to individuals diagnosed with LBA, (b) describe the current state of the empirical basis for mindfulness training in LBA, (c) summarize mindfulness meditation program designed for patients diagnosed with LBA, and (d) discuss future clinical and research directions in this area [8].

2. Conceptual Definitions

2.1. Mindfulness Meditation

“Mindfulness means paying attention in a particular way; on purpose, in the present moment, and nonjudgmentally” – (Jon Kabat-Zinn, 2008).

2.2. Low Back Pain

LBP is pain, muscle tension, or stiffness localized below the costal margin and above inferior gluteal folds, with or without sciatica, and is defined as chronic when it persists for 12 weeks and more. (*medicaldictionary.thefreedictionary.com*)

2.3. Adjunctive Medium

Adjunctive refers to an accessory or auxiliary agent or measure. It can be something attached to another as a supplementary or subordinate (*Medical dictionary.thefreedictionary.com*)

2.4 Occupational Therapy

Occupational Therapy is a client-centered health profession concerned with promoting health and well-being through occupation (**World Federation of Occupational Therapist, 2012**)[9]

3. Research Methodology

3.1 Aims of Study

To address all elements of a person's health and wellbeing and integrate the physical, cognitive, and psychological components for pain management.

3.2 Objectives of the study

Provide strategies that enable clients to increase participation in meaningful daily activities. To increase life skill that enables self-helping skills during pains.

3.3 Research design

Randomized control Trial Experimental

3.4 Screening criteria

Inclusion Criteria

- Medical history of persisting pain for at least 6 months.

- Both gender
- Age group (30 – 45years)
- Language – Tamil and English
- Consent and willingness to alternate complementary therapies for pain.

Exclusion Criteria

- History of spine injury
- Combination with other chronic diseases – like diabetes, Tuberculosis, Alziemer's disease, Heart failure, Shortness of breath etc.

3.5 Assessment Tools

- Oswestry Low back Pain Disability Questionnaire
- Visual Analogue Scale

3.6 Data collection procedure

Patient with low back pain (age 30 years to 45 years) were recruited based upon the inclusion and exclusion criteria. The purpose of the study was explained to the subjects. Written consent form was obtained from each subject. All participants were assessed individually with Oswestry Low back pain disability questionnaire and Visual analogue scale. After completion of 32 sessions, Oswestry Low back pain disability questionnaire and Visual analogue scale were administered to all participants to determine the post-test performance. These enable comparison between pre and post-test performance of the patient.

4. Data Analysis and Interpretation

4.1 Data analysis

Comparative and inferential statistical analysis has been carried out in this present study. Results on continuous measurements are presented on Mean \pm SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at P value <0.05 level of significance. The following assumptions on data are made; Dependent variables should be normally distributed, Samples drawn from the population should be random, and Cases of the samples should be independent. Comparative statistical analyses (Mean, range & SD) to find out the baseline characteristics (like Pain Intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life, social life and Travelling) of the samples. Percentage Analysis was used to describe the participants with respect to certain demographic characteristics such pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life, social life and travelling. Correlation has been performed to examine the relationship between the attitudinal differences in the ten subjects. Student T- test has been used to find the significance of study parameters on continuous scale between ten groups (Inter group analysis) on metric parameters. Student t test has been used to find the significance of study parameters on continuous scale within each group.

Chi-square test and Independent t test were used to find the difference among the ten variables. P value <0.05 is

considered to be significance of study parameters on categorical scale between three or more groups.

4.2 Interpretation

This present study is focusing on effectiveness of mindfulness meditation as an adjunctive medium to low back pain management. The outcome of this study illustrates the effectiveness of mindfulness meditation in low back pain reduction among patients of various groups. Statistical analysis with reference to chi-square, inferential statistic and P-Value show improvement among the 30 experimental groups based on Oswestry low back pain disability questionnaire which was used to determine the outcome measure. All participants both the control and experimental groups were subjected to Visual Analogue Scale prior to application of Oswestry low back pain disability questionnaire which denotes the outcome performance of the two groups. Analysis shows that experimental group is more proficient in performance base on Oswestry low back pain disability questionnaire scoring with adequate significant improvement measure as explained below: 10 subcomponents out of 11 subcomponents of Oswestry low back pain disability questionnaire shows improvement with P Value of (0.0001) in area of pain intensity, personal care, lifting, sitting, standing, sleeping, sex life, social life and travel. Although patients show highly significant P Value of (0.002) in area of walking as compare to other sub components. The Visual Analogue Scale also shows minimal improvement in respect to control group with P Value of (0.0001). Post test scores suggests that intervention had more effect on the experimental group compared to those in control group. The results showed that the experimental group who were subjected to Mindfulness Meditation program showed a significant improvement in their overall pain severity, physical and mental quality of life scores due to the training received as compared to the control group who received only usual medical care. In the first session, information was given about the fundamentals of mindfulness, describing the mindfulness supporting attitude included being nonjudgmental towards thoughts, emotions or sensations as they arise. Furthermore, during body scan activities, they learned to see their real body conditions, as it truly was, without trying to change the reality. Mindful living techniques also helped to improve their quality of life by teaching them to pay more attention to their daily life necessities. The outcome of this study can be supported with previous research conducted by; **National Center for Complementary and Integrative Health (NCCIH), on Mindfulness based stress reduction (MBSR)** which may prove more effective than usual treatment in alleviating chronic low-back pain, Researchers from the Group Health Cooperative, Seattle, and the University of Washington, Seattle, conducted a study, published in the Journal of the American Medical Association, in which 342 participants aged 20 to 70 used one of the two mind and body approaches or sought usual care for one year. At 26 and 52 weeks, participants using MBSR had greater improvement in function and back pain compared to the group that remained in standard care. Though pain intensity improves in experimental groups, those using MBSR, however, continued to see improvement at 52 weeks, leading researchers to

conclude MBSR may be an effective treatment for chronic low-back pain[10]. Also, reference to a study conducted by; **Natalia E. Morone et-al** on Mindfulness meditation for the treatment of chronic low back pain in older adults: A randomized controlled pilot study [11]. The objectives of this pilot study were to assess the feasibility of recruitment and adherence to an eight-session mindfulness meditation program for community-dwelling older adults with chronic low back pain (CLBP) and to develop initial estimates of treatment effects. It was designed as a randomized, controlled clinical trial. Participants were 37 community-dwelling older adults aged 65 years and older with CLBP of moderate intensity occurring daily or almost every day. Participants were randomized to an 8-week mindfulness-based meditation program or to a wait-list control group. Baseline, 8-week and 3-month follow-up measures of pain, physical function, and quality of life were assessed. Eighty-nine older adults were screened and 37 found to be eligible and randomized within a 6-month period. The mean age of the sample was 74.9 years, 21/37 (57%) of participants were female and 33/37 (89%) were white. At the end of the intervention 30/37 (81%) participants completed 8-week assessments. Average class attendance of the intervention arm was 6.7 out of 8. They meditated an average of 4.3 days a week and the average minutes per day was 31.6. Compared to the control group, the intervention group displayed significant improvement in the Chronic Pain Acceptance Questionnaire Total Score and Activities Engagement subscale ($P = .008$, $P = .004$) and SF-36 Physical Function ($P = .03$). An 8-week mindfulness-based meditation program is feasible for older adults with CLBP. The program may lead to improvement in pain acceptance and physical function. In this present study, the participants uncoupled different components of the experience of pain. Breathing exercises distract their mind from pain to mindful breathing and mindful living making them aware of their environment as a complementary advance improvement beyond pain reduction.

5. Clinical Implication, Limitation, Conclusion and Future Recommendations

5.1 Clinical implication

Mindfulness meditation can be used as part of intervention protocol to improving low back pain. MM as a mind-body therapy including body scan, sitting, walking, and breathing was effective in reducing pain severity. According to “**Josephine Briggs**” which emphasizes on the needs of non-pharmacological treatment options for 25 million people who suffer from daily low back pain across the globe to complement occupational therapy practice through client centered approach [12].

5.2 Limitation

This study was involved with several limitations such as

- Un-uniformed usual care received by patients.
- The sample size was small and limited.
- This suggested for future researchers to conduct study considering physiologic variables such as MRI and

neurologic signals to test the efficacy of MM to decrease pain.

- Variability in different set-up use for the study
- However, Cherkin³⁵ noted that like all treatments for back pain, MBSR may not work for everyone. And more research is needed to see how long the effects last — the researchers were not able to look at the effects of MSRB beyond 2 months.

5.3 Conclusion

All together, the results of this study and previous studies highlighted the effectiveness of mindfulness meditation on low back pain. The program reduced pain perception and enhanced both physical and mental quality of life and impacted on the experimental group clearly in comparison to the usual medical care. People with chronic low back pain benefit with this new study findings. The practice may reduce pain and make it easier for patients to carry out their daily activities, according to the study outcomes. A number of research studies such as Plews-Ogan et al. Grossman et al., and Septon et al., (2007) have shown effectiveness of mindfulness meditation program in improving pain and quality of life of patients living with low back pain. The study suggests that mindfulness-meditation (MM) "is an effective treatment option for patients with chronic low back pain, Along with previous studies, "It is believed that there is enough evidence...to say that MM is a reasonable treatment option," for patients living with low back pain to start engaging in, "It is relatively safe and may improve people's life beyond just back pain," Cherkin et-al.said finally, The new findings "create a compelling argument for ensuring that an evidence-based health care system should provide access to affordable mind-body therapies".

5.4 Future Recommendations

In further study, the following are recommended,

- A larger sample size would give more significant results.
- Longer term follow up will be beneficial to study long term effect of intervention.
- Other Neuro-Muscular problems associated with LBP may be studied in future.

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