Original Article

A Comparative Study of Effect of Mindfulness-based Stress Reduction on Psychological Stress & Quality of Life in Patients of Rheumatoid Arthritis with Waitlist Control Group

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Background : For centuries, contemplative cultures have used meditation as a practice. Its medicinal effects have just recently been investigated, but the results point to a wide range of advantages. Rheumatoid Arthritis (RA), an autoimmune condition harm the body's joints and cause joint pain. Apart from jeopardizing the patient physically it also affects the psychological well-being. Given the research linking mindfulness to better immune indicators, mindfulness training may lessen disease-related stress in RA patients by boosting their immune system thereby improving their perceived stress as well as Quality of Life (QoL).

Aims and Objectives : To examine the effects of standardized Mindfulness-based Interventions (MBI) on psychological stress and QoL in a tertiary care hospital of eastern India.

Materials and Methods : 60 patients of RA were selected by purposive random sampling and divided into cases and waitlist controls comprising 30 patients in each group. The cases received MBI over a period of 6 months. Psychological Stress was estimated by Depression, Anxiety, Stress Scale (DASS) 21 and QoL by WHO QoL-BREF among both the groups at baseline, 4 months and 6 months post-intervention.

Results : Significant reduction of depression, anxiety and stress score was found in case group at 4th and 6th months. For the control group, it was not significant. The score was found to improve significantly in cases in the psychological domain of WHO QoL-BREF in the case group in 4th and 6th month. Scores in controls did not change significantly.

Conclusion : MBI caused a decrease in the depression, stress, and anxiety scores; while improving the psychological well-being of RA patients.

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Key words **: Rheumatoid Arthritis, Mindfulness-Based Stress Reduction, Quality of Life, Depression-Anxiety-Stress.**

The practice known as Mindfulness-based Stress Reduction (MBSR) uses mindfulness to assist patients with pain and other life difficulties that were first challenging to treat in a medical setting. In order to help individuals become more mindful, the MBSR program- which integrates yoga, body awareness and mindfulness meditation was developed at the University of Massachusetts Medical Center in the 1970s by Professor Jon Kabat-zinn[1,2]. Controlled clinical research on meditation has been conducted and the results[3] show that it could have positive benefits, including lowering stress levels, promoting relaxation, and enhancing Quality of Life[4]. MBSR is a secular concept despite having spiritual concepts at its root[5].

Editor's Comment :

- Rheumatoid Arthritis patients suffer from various psychological issues leading to a poorer Quality of Life.
- Mindfulness intervention can be a novel approach towards the holistic management of Rheumatoid Arthritis along with uplifting of the Quality of Life. Although, whether the intervention helps in decreasing the disease process of Rheumatoid Arthritis is a subject of research.

Rheumatoid Arthritis :

Rheumatoid Arthritis (RA) is a chronic, progressive autoimmune condition with no known cause. Persistent inflammation that mostly affects the joints in the periphery characterizes it. Although the pain and impairment may be reduced if the disorder is detected earlier and immediately and effectively treated, it often begins as an insidious symmetrical arthritis and has

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an unexpected and variable course.

RA often starts as a state of prolonged cellular activity that results in immune as well as autoimmunity complexes in the joints and other organs where it appears. The synovial membrane is where the illness first manifests itself and there, swelling and congestion allow immune cells to invade. The three phases of RA development include an initiation phase (induced by non-specific inflammation), an amplifying phase (resulting in activation of T cell) and a chronic inflammatory phase along the tissue damage[6].

Rheumatoid Arthritis and Stress :

The risk of experiencing different types of psychological distress is raised in people with Rheumatoid Arthritis[7]. According to a study conducted in 2010 in Michigan, USA, the authors found that stress plays a definite role in exacerbation of RA in addition to traumatic or stressful life experiences that occurred before the beginning of the disease[8].

Patients with RA and systemic lupus erythematosus were studied in experimental research that focused on acute-phase reactivity in the SLE (Stress-Response Systems)[9]. The Hypothalamic-Pituitary-Adrenal (HPA) axis, Autonomic Nervous System (ANS) and the immune system were evaluated at three levels of physiology in patients with SLE as well as RA. Although the baseline levels and reactivity of the ANS and HPA axis as well as experimentally produced stress were inconsistent, the authors did discover some signs of altered immune functioning in patients when compared to controls. A history of abuse and depression are quite frequent in people with rheumatologic disease and they have been related to changes in the immune and stress responses[10,11].

The findings from the current study of Stress consequences on SLE as well as RA point to a larger body of research that includes both animal models as well as the clinical investigations of other rheumatic conditions, which is consistent with the findings in these disorders. Numerous forms of stress have been seen in animal models to develop Arthritis[12].

Meditation holds the promise in lowering the stress related to emotional is associated with RA, which is why more and more people with RA are turning to complementary/alternative therapies[13]. This research investigates whether a Mindfulness-based Stress Reduction for Rheumatoid Arthritis patients would effectively lessen psychological distress and enhance well-being.

Materials and Methods

Study Participants :

Participants were based in a hospital, cross sectional study among Rheumatoid Arthritis patients and demographically & clinically matched controls who have attended the outpatient clinic of Rheumatology Department, IPGME&R, Kolkata in between March, 2017 to June, 2018. Purposive sampling was done to include 60 diagnosed cases of RA from Rheumatology OPD who were of 18 to 55 years of age and who have given consent. They were split into two groups, each with 30 patients. One group who received MBSR were cases; rest were waitlist controls. Patients who have not met the age criteria, who have Mental Retardation, or substance abuse disorder, had scheduled major surgery or already been participated in another major trial were excluded from the study. The IPGME&R, Kolkata, Ethics Committee reviewed the procedure before approving it. Each participant in the study-a patient or a control subject provided their informed permission.

Instruments :

- **DASS21 (Depression, Anxiety and Stress scale) :** A screening method for determining, classifying and evaluating patients' levels of stress, anxiety and depression. The three subscales of the exam are represented by these 3 negative emotional states: (1) depression, (2) anxiety and (3) stress[14].
- **WHO QoL (BREF) :** It is a self-administered questionnaire with 26 items that is a summary of the WHO QoL-100 scale. These scales evaluate the subjective reactions to various life situations based on assessments over the previous two weeks. In addition to overall well-being, it encompasses four areas: environment, social relationships, physical health, and psychological health. Each item receives a score ranging from 1 to 5. Better grades correspond to a higher QoL[15]. Bengali version was used.
- **Mindfulness-based Stress Reduction (MBSR) :** It is a structured, patient-centered educational method that utilizes mindfulness meditation training. The program's prototype was created by the Stress Reduction Clinic at the University of Massachusetts Medical Centre[16].

Study Technique : After obtaining informed consent from both cases and controls, the following parameters were assessed before the start of intervention for both the groups. These were DASS 21 for assessing psychological stress and WHO QoL (BREF) for measuring the Quality of Life. The mindfulness-based stress reduction was started in the case group. The groups were divided into 3 groups each comprising of 10 patients.They received 8 sessions weekly for 2 months, two monthly booster sessions for next 2 months and then for 2 months

maintenance programme where they were advised to practice MBSR as a homework assignment. Patients were followed up through phone calls and visit. Each patient was followed up for 6months. 2 patients were lost to follow-up. The waitlist control group received the intervention at the end of the study. The above-mentioned parameters were re-applied at the end of the 4th month and end of the sixth month on both cases and controls. The data collected by above means was analysed and compared by suitable statistical techniques and the results were interpreted accordingly. Treatment from Rheumatology department was not hampered.

Results

Data were put into a Microsoft Excel spreadsheet and evaluated statistically by SPSS 25.0 (Statistical package for social sciences)[17]. Baseline parameters were recorded for 60 patients who were clinically diagnosed Rheumatoid arthritis patients and randomized to case or control group in 1:1 ratio. After excluding 2 patients who dropped out from the study with no follow up at 4 months, a total of 58 eligible patients were analyzed for baseline and outcome parameters. Of these 58 patients, 28 belonged to the case group and 30 belonged to the control group. All of the research variables were compared between the two groups.

For the purpose of evaluating the effectiveness of the intervention, the adjusted mean change from baseline at 4 and 6 months was calculated 2 (treatment group) X 2 (time) linear mixed model for repeated measures with Mindfulness Based Stress Reduction and utilizing group contrasts to compare the control group. P-value <0.05 was taken as being significant.

(1) Socio Demographic Variables :

Gender : There were 13 females and 15 males in case group while control group had 16 females and 14 males. Chi-square test showed no difference in gender distribution [$S^2(1)$ =0.06, p =0.792, v= 0.03]. Overall female : male ratio was 1:1 (Fig 1).

Age : The average age of cases was 43.79±7.78 years. The average age of controls was 41.67±7.51 years. An independent samples t-findings test's showed no noticeable variations in the mean ages. (Fig 2).

(2) Psychological Stress : [DASS 21]

Results : Baseline means among the variables in the two groups were not significant (Table 1). During follow up at 4th& 6th month, the change was significant in DASS 21 scores in case group. When the change among the two groups were calculated, DASS 21 scores was found to be remarkable (Table 1, Figs 3, 4 & 5).

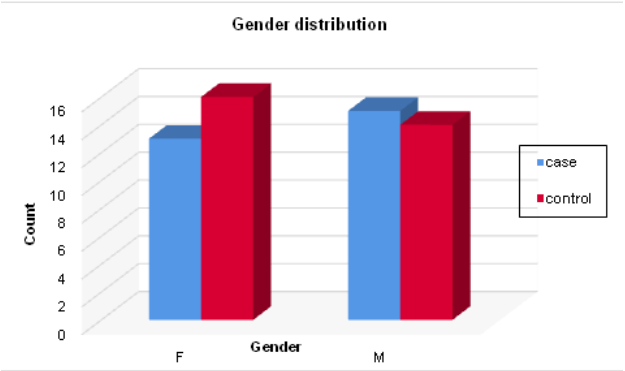

Fig 1 — Bar Graph showing Distribution of Gender Across Cases and Control (F-Female, M-Male)

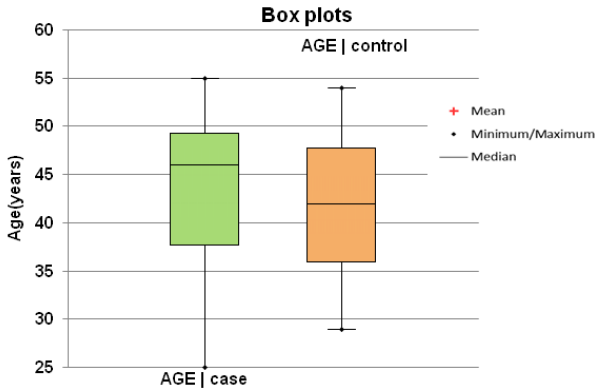

Fig 2 — Box Plot Showing Mean, Median and Range of Age In Two Groups

(3) Quality of Life Variables : [WHO QoL-BREF]

The baseline means among the variables among the two groups were not significant. At 4th & 6th month, the change was significant in Psychological &

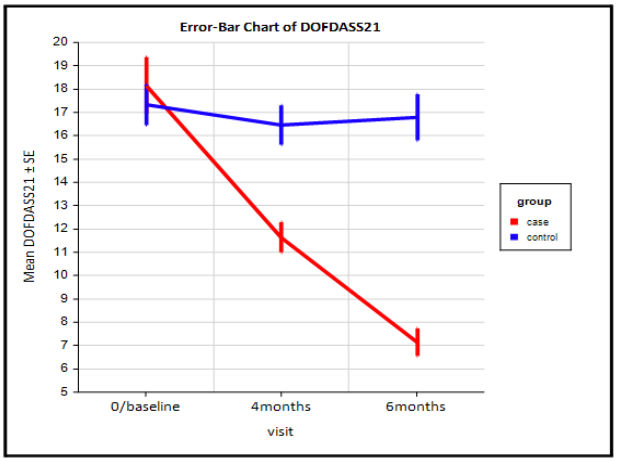

Fig 3 — Line Plot with Standard Error Bars for Depression Score of DASS 21

Table 1 — *Change in Sub-items of Dass Sacle at Fourth& Sixth Month*

Variables	Change among Case Group at 4thmonth [P Value]	Change among Control Group at 4thmonth [P Value]	Change among the Two Groups Over Time [P Value] [Calculated By Mixed Model Analysis of Variance]	Change among Case Group at 6thmonth [P Value]	Change among Case Group at 6thmonth [P Value]	Change among the Two Groups Over Time [P Value] [Calculated By Mixed Model Analysis of Variance]
Depression	<0.001	0.338	<0.001	<0.001	0.555	<0.001
Anxiety	<0.001	0.447	0.04	<0.001	0.411	0.04
Stress	<0.001	0.671	<0.001	<0.001	0.550	<0.001

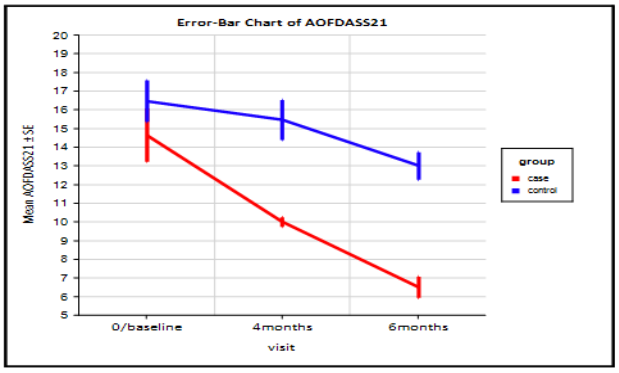

Fig 4 — Line Chart with Error Bars Showing Mean of Anxiety Score of DASS 21

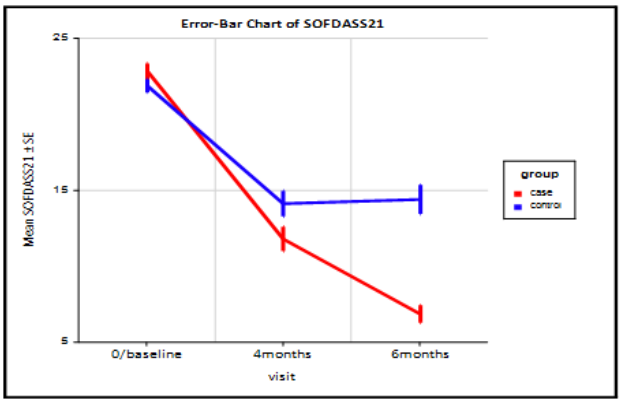

Fig 5 — Line Chart of Stress Scores of DASS 21 eith Standard Error Bars

Environmental Domain in the case group. Among the control group, the change was significant in Environmental Domain.When the change among the two groups were calculated, Psychological Domain score was found to be significant (Table 2, Fig 6).

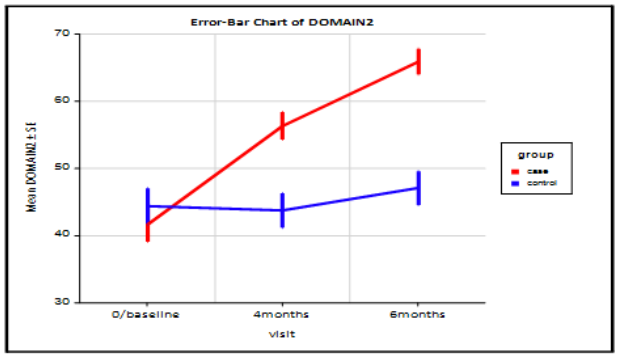

Fig 6 — Line Chart of Domain 2 or Psychologicaldomain

Discussion

Mindfulness can have positive effects on Rheumatoid Arthritis (RA) patients, both in terms of their physical symptoms and psychological well-being. Rheumatoid arthritis is a chronic autoimmune disease that affects the joints, causing pain, stiffness and inflammation. It can also lead to fatigue, anxiety and depression, affecting the overall Quality of Life of those living with the condition. In our study,there were 13 females and 15 males in the case group while the control group had 16 females and 14 males. The chi-square test showed no difference in gender distribution. Overall female: male ratio was 1:1. The average age of cases was 43.79±7.78 years. The average age of controls was 41.67±7.51 years. An independent samples t-test resulted in no apparent variation in the mean ages. MBSR was found to improve depression, anxiety and stress scores of the cases in the 4th and 6th month compared to controls in DASS Scoring. Similarly, the psychological domain of WHOQoL-BREF was found to improve in cases in comparison to the control group. The above results were consistent with

Table 2 — Change In Quality of Life Variables [WHO QoL-BREF] At Sixth Month

Variables	Change among Case Group at 4thmonth [P Value]	Change among Control Group at 4thmonth [P Value]	Change among the Two Groups Over Time [P Value] [Calculated by Mixed Model Analysis of Variance]	Change among Case Group at 6thmonth [P Value]	Change among Case Group at 6thmonth [P Value]	Change among the Two Groups Over Time [P Value] [Calculated by Mixed Model Analysis of Variance]
Physical Domain	0.794	0.844	0.99	0.511	0.62	0.99
Psychological Domain	<0.001	0.08	<0.001	<0.001	0.08	<0.001
Social Domain	0.883	0.47	0.98	0.883	0.47	0.98
Environmental Domain	0.002	0.004	0.967	0.002	0.004	0.967

some previous studies such as Teasdale, *et al* 2000[18], Morone, *et al* 2008[19], Witkiewitz, *et al*[20], Desrosiers *et al*[21]. However, it's important to note that mindfulness should be considered a complementary approach alongside conventional medical treatments prescribed by healthcare professionals. Patients should always consult with their doctors before incorporating mindfulness practices into their treatment plans.

Limitations :

- We were only able to recruit a modest number of patients due to the resources available to the recruitment team. For future investigations, it will be important to have a larger sample size.
- The disease activity along with the anti-rheumatoid medications received by both groups was not considered.

Future Directions :

Following can be thought of in the coming days to ensure a more —

(1) Study with a long-term follow-up and a moderate number of patients can be considered to see the lasting effect of MBSR.

(2) Incorporating telemedicine advice within the study to ensure proper follow-up.

(3) Conducting studies to explore the potential benefit of combining Mindfulness-based Stress Reduction with standard pharmacological treatment of RA.

(4) We can explore mindfulness and brain plasticity relations.

(5) Investigations can be done on whether mindfulness-based therapy is improving inflammatory markers in rheumatoid arthritis.

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Conflicts of Interest : There are no conflicts of interest.

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References

1 Pickert K — The art of being mindful. Finding peace in a stressed-out, digitally dependent culture may just be a matter of thinking differently. *Time* 2014; **183(4):** 40-6.
2 Will A, Rancea M, Monsef I, Wöckel A, Engert A, Skoetz N — Mindfulness-based stress reduction for women diagnosed with breast cancer. *Cochrane Database of Systematic Reviews* 2015; **2:** doi:10.1002/14651858.cd011518. ISSN 1465-1858
3 Ospina MB, Bond K, Karkhaneh M — Meditation practices for health: state of the research. *Evid Rep Technol Assess (Full Rep)* 2007; **155:** 35-37.
4 Bryant FB, Veroff J — Savoring: A new model of positive experience. Psychology Press; 2017 Sep 29; **1:**
5 Greeson JM, Webber DM, Smoski MJ, Brantley JG, Ekblad AG, Suarez EC, *et al* — Changes in spirituality partly explain health-related quality of life outcomes after Mindfulness-Based Stress Reduction. *Journal of Behavioral Medicine* 2011; **34(6):** 508-18.
6 Harrison's Principles of Internal Medicine (18th ed.). United States: McGraw Hill.2012: 2738.
7 Keefe FJ, Smith SJ, Buffington AL, Gibson J, Studts JL, Caldwell DS — Recent advances and future directions in the biopsychosocial assessment and treatment of arthritis. *J Consult Clin Psycho*l 2002; **70:** 640-55.
8 Hassett A, Daniel JC — The role of stress in rheumatic diseases. 2010; 123.
9 de Brouwer SJ, van Middendorp H, Kraaimaat FW, Radstake TR, Joosten I, Donders AR, *et al* — Immune responses to stress after stress management training in patients with rheumatoid arthritis. *Arthritis Research & Therapy* 2013; **15(6):** R200.
10 Kojima M, Kojima T, Suzuki S, Oguchi T, Oba M, Tsuchiya H, *et al* — Depression, inflammation, and pain in patients with rheumatoid arthritis. *Arthritis Care & Research* 2009; **61(8):** 1018-24.
11 McLean SA, Williams DA, Stein PK, Harris RE, Lyden AK, Whalen G, *et al* — Cerebrospinal fluid corticotropin-releasing factor concentration is associated with pain but not fatigue symptoms in patients with fibromyalgia. *Neuropsychopharmacology* 2006; **31(12):** 2776.
12 Harbuz MS, Richards LJ, Chover- Gonzalez AJ, Marti Sistac O, Jessop DS — Stress in autoimmune disease models. Annals of the New York Academy of Sciences 2006; **1069(1):** 51-61.
13 Dube SR, Fairweather D, Pearson WS, Felitti VJ, Anda RF, Croft JB — Cumulative childhood stress and autoimmune diseases in adults. *Psychosomatic Medicine* 2009; **71(2):** 243..
14 Lovibond SH, Lovibond PF — Manual for the Depression Anxiety Stress Scales. (2nd. Ed.) Sydney: *Psychology Foundation*. 1995.
15 Group TW — The World Health Organization quality of life assessment (WHOQOL): development and general psychometric properties. *Social Science & Medicine* 1998; **46(12):** 1569-85.
16 Santorelli S, editor. Mindfulness-based stress reduction (MBSR): standards of practice. Center for Mindfulness in Medicine, Health Care & Society, University of Massachusetts Medical School; 2014 Feb.
17 IBM SPSS Statistics for Macintosh, Version 25.0.
18 Teasdale JD, Segal ZV, Williams JM, Ridgeway VA, Soulsby JM, Lau MA — Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. Journal of Consulting and Clinical Psychology 2000; **68(4):** 615
19 Morone NE, Greco CM, Weiner DK — Mindfulness meditation for the treatment of chronic low back pain in older adults: a randomized controlled pilot study. *Pain* 2008; **134(3):** 310-9.
20 Witkiewitz K, Bowen S — Depression, craving, and substance use following a randomized trial of mindfulness-based relapse prevention. J*ournal of Consulting and Clinical Psychology* 2010; **78(3):** 362.
21 Desrosiers A, Vine V, Klemanski DH, Nolen Hoeksema S — Mindfulness and emotion regulation in depression and anxiety: common and distinct mechanisms of action. Depression and Anxiety 2013; **30(7):** 654-61.