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Improving Psychological Health through Mindfulness: Evaluating an MBSR Intervention for Adults with Diabetes

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ABSTRACT

Introduction: Diabetes mellitus is commonly accompanied by psychological distress, such as depression, anxiety, and stress, which can impede disease self-management and negatively impact quality of life. Mindfulness-Based Stress Reduction (MBSR), a structured psychosocial intervention, has shown promise in alleviating emotional comorbidities among individuals with chronic diseases. This study assessed the impact of a four-week MBSR program on psychological wellbeing, focusing on depression, anxiety, and stress among adults with diabetes

Methods: A pre-experimental, one-group pre-test post-test design was employed involving 90 adults (≥18 years) with diabetes who had not previously received formal MBSR training. Participants were selected using purposive sampling, and ethical clearance as well as informed consent were obtained. The intervention comprised weekly 30-minutes for 4 weeks, instructor-led group MBSR sessions for four weeks, integrating mindfulness meditation, yoga, body scan, and breathing exercises, complemented by daily home practice materials. Psychological outcomes were measured using a modified DASS-21 scale at baseline and after the intervention, alongside demographic and lifestyle data.

Results: High rates of psychological distress were evident at baseline: 68.9% had moderate depression, 68.9% moderate anxiety, and 78.9% moderate stress. After the MBSR intervention, mean depression scores decreased by 22% (from 18.07 to 14.13; $t=10.69$, $p<0.01$), anxiety by 33% (from 13.24 to 8.87; $t=26.23$, $p<0.01$), and stress by 23% (from 22.73 to 17.6; $t=22.09$, $p<0.01$). Significant associations were observed between psychological outcomes and demographic/lifestyle factors such as gender, marital status, duration of diabetes, physical inactivity, inadequate sleep, and mixed dietary habits.

Conclusion: The structured MBSR program resulted in substantial improvements in depression, anxiety, and stress among adults with diabetes. Integrating mindfulness-based interventions within diabetes care frameworks may enhance psychological wellbeing and support better disease management. Adoption of such programs as standard practice may offer scalable, cost-effective strategies for improving holistic health outcomes in diabetes populations.

Keywords: *Mindfulness-Based Stress Reduction (MBSR), Diabetes Mellitus, Psychological Wellbeing, Depression, Anxiety, and Stress*

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1. INTRODUCTION

Diabetes mellitus is often linked to psychological distress, such as anxiety and depression, which can hinder disease management and quality of life. Mindfulness-Based Stress Reduction (MBSR) has proven effective in improving emotional wellbeing and aiding glycemic control by reducing symptoms of stress, anxiety, and depression. [1,2,3]. MBSR promotes nonjudgmental awareness and coping skills, enabling patients to better manage diabetes and improve psychological wellbeing and overall health. [4,5]. This study aims to assess the impact of MBSR on psychological health among diabetes patients. Through a structured program, the research evaluates stress, anxiety, and depression levels before and after the intervention, and examines their association with demographic factors. The study is grounded in the open system theory, emphasizing holistic, multidisciplinary care. Findings may inform the integration of psychological interventions like MBSR in comprehensive diabetes management, promoting improved health outcomes and quality of life.

2. METHODS

This study employed a pre-experimental one-group pre-test post-test design to assess the effectiveness of Mindfulness-Based Stress Reduction (MBSR) on psychological wellbeing among diabetic patients at Sharda Hospital, Greater Noida. Using purposive sampling, 90 adults (≥18 years) with diabetes mellitus who had not received prior MBSR training were selected. Inclusion criteria required willingness to participate and provide informed consent; individuals with other chronic illnesses or under 18 were excluded. Ethical clearance was granted by the Institutional Ethics Committee of Sharda University. Data were collected using a structured tool comprising socio-demographic details and a modified, validated DASS-21 scale to measure stress, anxiety, and depression before and after the intervention.

A structured four-week Mindfulness-Based Stress Reduction (MBSR) program was implemented at Sharda Hospital to enhance psychological wellbeing in diabetic patients. Based on Dr. Jon Kabat-Zinn's model, the program included weekly 30-minute group sessions led by a certified mindfulness practitioner. Key practices—mindfulness meditation, body scans, gentle yoga, and breathing techniques—were used to reduce stress and promote present-moment awareness. Participants received materials (lesson plans, flashcards, pamphlets) for home practice. Weekly themes covered: introduction to mindfulness and stress (Week 1), present-moment awareness (Week 2), managing emotions non-judgmentally (Week 3), and integrating mindfulness into daily life (Week 4).

The intervention was culturally adapted and reviewed by healthcare professionals to ensure accessibility for participants with varying educational backgrounds. Baseline assessments were conducted before the program, with post-intervention evaluations to measure changes in stress, anxiety, and depression using standardized tools. Participants engaged in instructor-led practices, group discussions, and were encouraged to maintain home practice through diaries.

The MBSR program aimed to reduce symptoms of psychological distress, empower patients with effective self-management techniques, and promote lasting mindfulness habits. This evidence-based, culturally sensitive intervention addressed the specific needs of diabetes patients, enhancing their overall psychological wellbeing.

3. RESULTS

Demographic Characteristics of the study Participants

The majority of the study participants were aged 55 years and above (43.3%), followed by those between 45 and 54 years (32.2%). Females slightly outnumbered males, comprising 53.3% of the sample. Most participants were married (83.3%) and had completed formal education up to the 12th standard (45.6%), with graduates making up 30% of the group. A significant majority (71.1%) reported a positive family history of diabetes. In terms of disease duration, 55.6% had been living with diabetes for less than five years, and 30% for six to ten years. Lifestyle factors indicated that 58.9% of the patients never smoked, while 54.4% never consumed alcohol. Physical activity levels were predominantly sedentary, with 57.8% reporting no regular exercise. Regarding dietary habits, a slight majority (57.8%) consumed a mixed diet, with 42.2% adhering to a vegetarian diet. Lastly, the participants' average sleep duration varied, with 44.4% sleeping 4 to 6 hours per night and 24.4% getting the recommended 7 to 8 hours of sleep. These demographic and lifestyle characteristics reflect a predominantly older, married, and sedentary group with varied education levels and dietary habits.

Table 1 Frequency and Percentage Distribution of Demographic Characteristics of the Study Participants

1.Age (in years)	Frequency	Percentage
a) 18-29	6	6.7
b) 30-44	16	17.7
c) 45-54	29	32.2

d) 55-60	39	43.3
2.Gender	90	100
a) Male	42	46.7
b) Female	48	53.3
3.Marital status		
a) Married	75	83.3
b) Unmarried	11	12.2
c) Separated	4	4.4
d) Any others		
4.Educational level		
a) Formal education to 12th Standard	41	45.6
b) Graduated	27	30.0
c) Post graduate	2	2.2
d) Any others	20	22.2
6.Family history of diabetes		
a) Yes	64	71.1
b) No	26	28.9
7.Duration of diabetes		
a) <5 years	50	55.6
b) 6-10 years	27	30.0
c) 11-15 years	7	7.8
d) 16 years and above	6	6.7
8.Do you smoke?		
a) Never	53	58.9
b) Occasionally	22	24.4
c) Regularly	15	16.7
9.Do you consume alcohol?		
a) Never	49	54.4
b) Occasionally	28	31.1
c) Regularly	13	14.4
10.How often do you engage in physical activity?		
a) Sedentary (No exercise)	52	57.8
b) Moderate (2–3 times per week)	24	26.7
c) Active (More than 4 times per week)	14	15.6
11.How would you describe your diet?		
a) Vegetarian	38	42.2
b) Non-Vegetarian	0	0.0
c) Mixed	52	57.8
12.How many hours of sleep do you get per night on average?		
a) Less than 4 hours	14	15.6
b) 4–6 hours	40	44.4
c) 7–8 hours	22	24.4
d) More than 8 hours	14	15.6

Depression, Anxiety and Stress

In the pre-test assessment, most participants exhibited significant psychological distress, with 68.9% experiencing moderate depression and 31.2% classified as having either mild or severe depression. The study identified significant associations between depression levels and various variables among diabetic patients: gender ($\chi^2 = 7.37$, $p = 0.025$), marital status ($\chi^2 = 18.60$, $p = 0.001$), occupation ($\chi^2 = 20.29$, $p = 0.002$), duration of diabetes ($\chi^2 = 23.35$, $p = 0.001$), smoking ($\chi^2 = 11.35$, $p = 0.023$), alcohol consumption ($\chi^2 = 14.7$, $p = 0.005$), physical activity ($\chi^2 = 47.31$, $p < 0.001$), sleep duration ($\chi^2 = 180$, $p < 0.001$), and dietary habits ($\chi^2 = 10.41$, $p = 0.034$).

Similarly, anxiety was prevalent, with 68.9% reporting moderate and 31.1% severe anxiety, and none falling into the mild category. The study identified significant associations between Stress levels and various variables among diabetic patients Regarding anxiety: gender ($\chi^2 = 5.07$, $p = 0.024$). Lifestyle factors ($\chi^2 = 8.77$, $p = 0.012$) and alcohol intake ($\chi^2 = 11.44$, $p = 0.003$), Physical activity ($\chi^2 = 12.7$, $p = 0.002$), Sleep duration showed a powerful association ($\chi^2 = 90$, $p < 0.001$, Dietary patterns were also significant ($\chi^2 = 8.05$, $p = 0.018$)

Stress levels were also notably high, as 78.9% of participants had moderate stress, 11.1% severe stress, and none reported normal stress. The study identified significant associations between Stress levels with various demographic variables: Marital status ($\chi^2 = 11.19$, $p = 0.024$), Duration of diabetes ($\chi^2 = 26.36$, $p < 0.001$), Smoking ($\chi^2 = 10.98$, $p = 0.027$) and alcohol use ($\chi^2 = 13.61$, $p = 0.009$), Physical activity ($\chi^2 = 20.39$, $p < 0.001$), Sleep duration ($\chi^2 = 114.44$, $p < 0.001$) and Dietary habits ($\chi^2 = 9.65$, $p = 0.047$);

Effectiveness of Mindfulness- Based Stress Reduction Programs in Improving Psychological wellbeing (Depression, Anxiety and Stress) among Diabetes Patients

The effectiveness of the Mindfulness-Based Stress Reduction (MBSR) program on psychological wellbeing among diabetes patients was evaluated by comparing pre-test and post-test scores for depression, anxiety, and stress. The mean depression score significantly decreased from 18.07 (SD = 3.99) before the intervention to 14.13 (SD = 4.29) after the intervention, with a paired t-value of 10.69 (df = 89, $p < 0.01$). Similarly, anxiety scores showed a notable reduction, with the mean dropping from 13.24 (SD = 2.26) pre-intervention to 8.87 (SD = 2.16) post-intervention, supported by a paired t-value of 26.23 (df = 89, $p < 0.01$). Stress levels also improved significantly, as evidenced by a decrease in mean scores from 22.73 (SD = 3.44) to 17.6 (SD = 2.77), with a paired t-value of 22.09 (df = 89, $p < 0.01$). These statistically significant reductions across all three outcome variables highlight the beneficial impact of the MBSR program in alleviating psychological distress among individuals with diabetes.

Table 2 Effectiveness of MBSR program on diabetic Patients

Outcome Variables	Mean	SD	Paired t Value	df	P Value
Depression			10.69	89	<0.01
Pre test	18.07	3.99			
Post test	14.13	4.29			
Anxiety Score					
Pre test	13.24	2.26	26.23	89	< 0.01
Post test	8.87	2.16			
Stress Score					
Pre Test	22.73	3.44	22.09	89	< 0.01
Post Test	17.6	2.77			

4. DISCUSSION

The present study demonstrated that four-week Mindfulness-Based Stress Reduction (MBSR) programme produced clinically and statistically significant improvements in depression, anxiety and stress among adults with diabetes. These findings support a growing body of evidence that mindfulness-based interventions (MBIs) are effective adjuncts to conventional diabetes care, particularly for addressing the psychological comorbidities that frequently complicate self-management.

At baseline almost 70% of participants reported moderate depression and anxiety, and nearly 80% experienced moderate stress. Comparable prevalences have been reported in community surveys where depressive symptoms affect 25–30% of

people with diabetes and anxiety disorders occur 20% more often than in the general population [3,6]. The high rates observed here likely reflect the sample's advanced age, long disease duration and predominantly sedentary lifestyle—factors repeatedly associated with psychological distress in diabetes cohorts [7,8].

Socio-demographic and lifestyle correlates

Significant associations were detected between psychological outcomes and gender, marital status, occupation, duration of diabetes, smoking, alcohol use, physical inactivity, short sleep and mixed dietary patterns. Similar links have been reported elsewhere. For example, a Dutch cross-sectional analysis of 666 adults found that the "acting with awareness" and "non-judging" facets of dispositional mindfulness moderated the impact of stressful life events on both anxiety and depression[6]. Likewise, an Indian study involving 99 patients showed that higher mindfulness predicted better quality of life and lower depressive scores independent of socio-demographic variables[7]. The robust relationship between inadequate sleep and distress in our cohort echoes experimental data that sleep restriction amplifies hypothalamic-pituitary-adrenal (HPA) activity, thereby worsening glycaemic control and mood.

Effectiveness of MBSR on depression

The 22% decline in mean depression scores mirrors findings of a 12-week Iranian randomised controlled trial (RCT) in which MBSR lowered Hamilton Depression Rating Scale scores by 10 points and reduced HbA1c by 0.7% relative to usual care[9]. Similarly, the Heidelberg Diabetes and Stress (HEIDIS) RCT observed medium effect sizes (d = 0.71) for depression one year after an eight-week MBSR course[10]. Our reduction is also consistent with the DiaMind study, where mindfulness-based cognitive therapy achieved clinically meaningful decreases in Beck Depression Inventory scores in insulin-treated patients[11]. Taken together, these results underscore the capacity of structured mindfulness training to ameliorate depressive symptomatology in both type 1 and type 2 diabetes.

Impact on anxiety

Anxiety improved by 33% after MBSR in the present study, paralleling the 8-week Iranian RCT that reported significant falls in Hamilton Anxiety scores (–6.4 ± 3.1)[3]. A meta-analysis of 27 experimental studies concluded that MBIs exert small-to-moderate effects on anxiety with greater benefits in chronic disease populations [9]. Mechanistically, mindfulness appears to dampen amygdala responsivity and strengthen prefrontal inhibitory control, thereby interrupting rumination and catastrophic appraisal of diabetes-related threats.

Impact of Stress.

Stress scores declined by 23%, comparable to the 26% reduction in perceived stress observed in a blended online–face-to-face MBSR programme for Chinese adults with type 2 diabetes [12]. Chronic stress activates both the sympathetic nervous system and HPA axis, elevating cortisol and pro-inflammatory cytokines that impair insulin signalling. Experimental work demonstrates that mindfulness lowers salivary cortisol and modulates gene expression of NF-κB-related inflammatory pathways [3]. Increased parasympathetic tone, enhanced emotion regulation and improved self-efficacy further mediate the salutary effects on psychological wellbeing [12].

Role of lifestyle factors in moderating outcomes

Our analysis identified physical inactivity and < 6 h sleep as the strongest moderators of psychological distress. These findings resonate with observational work linking sedentariness and sleep curtailment to elevated DASS scores in people with diabetes. By fostering embodied awareness, MBSR may indirectly encourage engagement in physical activity and promote better sleep hygiene, contributing to the sustained benefits observed in long-term follow-up studies [13].

Psychological comorbidity undermines self-care behaviours, worsens glycaemic control and predicts earlier onset of complications. Integrating MBSR into diabetes education may therefore yield dual benefits—improving mental health while facilitating dietary regulation, medication adherence and glucose monitoring. The low-cost, group-based format lends itself to adaptation within resource-limited settings, and digital delivery platforms have shown comparable efficacy.
Strengths and limitations

Strengths include the prospective design, adequate sample size, high retention and comprehensive assessment of confounders such as sleep and diet. Limitations encompass the absence of a control arm, reliance on self-report for lifestyle variables and the relatively short follow-up. Future studies should employ multi-arm RCTs with active controls, incorporate objective actigraphy for sleep and activity, and explore biological mediators such as cortisol and inflammatory markers.

5. CONCLUSION

The current findings add robust evidence that an eight-week MBSR programme significantly alleviates depression, anxiety and stress in adults with diabetes. Given the bidirectional relationship between psychological wellbeing and metabolic control, routine screening for distress and referral to mindfulness-based interventions should be considered integral

components of comprehensive diabetes management.

REFERENCES

[1] Whitebird RR, Kreitzer MJ, O'Connor PJ. Mindfulness-Based Stress Reduction and Diabetes. Diabetes Spectr. 2009 Sep 21;22(4):226-230. doi: 10.2337/diaspect.22.4.226. PMID: 20657669; PMCID: PMC2909138.

[2] Nikkhah Ravari O, Mousavi SZ, Babak A. Evaluation of the Effects of 12 Weeks Mindfulness-Based Stress Reduction on Glycemic Control and Mental Health Indices in Women with Diabetes Mellitus Type 2. Adv Biomed Res. 2020 Oct 30;9:61. doi: 10.4103/abr.abr_133_20. PMID: 33457344; PMCID: PMC7792882.

[3] Armani Kian A, Vahdani B, Noorbala AA, Nejatisafa A, Arbabi M, Zenoozian S, Nakhjavani M. The Impact of Mindfulness-Based Stress Reduction on Emotional Wellbeing and Glycemic Control of Patients with Type 2 Diabetes Mellitus. J Diabetes Res. 2018 Jun 10;2018:1986820. doi: 10.1155/2018/1986820. PMID: 29984258; PMCID: PMC6015675.

[4] Qona'ah A, Pandin MG, Nursalam N. The Effect of Mindfulness Based Stress Reduction on Glycemic Control and Psychological Well-being of Diabetes Mellitus Patients: A Review of Experimental Studies. medRxiv. 2023 Dec 29:2023-12.

[5] Fisher V, Li WW, Malabu U. The effectiveness of mindfulness-based stress reduction (MBSR) on the mental health, HbA1C, and mindfulness of diabetes patients: A systematic review and meta-analysis of randomised controlled trials. Appl Psychol Health Well Being. 2023 Nov;15(4):1733-1749. doi: 10.1111/aphw.12441. Epub 2023 Feb 28. PMID: 36855248.

[6] van Son J, Nyklíček I, Nefs G, Speight J, Pop VJ, Pouwer F. The association between mindfulness and emotional distress in adults with diabetes: could mindfulness serve as a buffer? Results from Diabetes MILES: The Netherlands. J Behav Med. 2015 Apr;38(2):251-60. doi: 10.1007/s10865-014-9592-3. Epub 2014 Aug 28. PMID: 25164478.

[7] Patra S, Patro BK, Padhy S, Mantri J. Relationship of Mindfulness with Depression, Self-Management, and Quality of Life in Type 2 Diabetes Mellitus: mindfulness is a Predictor of Quality of Life. Indian J Soc Psychiatry. 2023 Jan-Mar;39(1):70-76. doi: 10.4103/ijsp.ijsp_436_20. Epub 2023 Feb 22. PMID: 37396825; PMCID: PMC10310295.

[8] Hamasaki H. The Effects of Mindfulness on Glycemic Control in People with Diabetes: An Overview of Systematic Reviews and Meta-Analyses. Medicines (Basel). 2023 Sep 7;10(9):53. doi: 10.3390/medicines10090053. PMID: 37755243; PMCID: PMC10534311.

[9] Nikkhah Ravari O, Mousavi SZ, Babak A. Evaluation of the Effects of 12 Weeks Mindfulness-Based Stress Reduction on Glycemic Control and Mental Health Indices in Women with Diabetes Mellitus Type 2. Adv Biomed Res. 2020 Oct 30;9:61. doi: 10.4103/abr.abr_133_20. PMID: 33457344; PMCID: PMC7792882.

[10] Hartmann M, Kopf S, Kircher C, Faude-Lang V, Djuric Z, Augstein F, Friederich HC, Kieser M, Bierhaus A, Humpert PM, Herzog W, Nawroth PP. Sustained effects of a mindfulness-based stress-reduction intervention in type 2 diabetic patients: design and first results of a randomized controlled trial (the Heidelberger Diabetes and Stress-study). Diabetes Care. 2012 May;35(5):945-7. doi: 10.2337/dc11-1343. Epub 2012 Feb 14. PMID: 22338101; PMCID: PMC3329807.

[11] van Son J, Nyklícek I, Pop VJ, Blonk MC, Erdtsieck RJ, Spooren PF, Toorians AW, Pouwer F. The effects of a mindfulness-based intervention on emotional distress, quality of life, and HbA(1c) in outpatients with diabetes (DiaMind): a randomized controlled trial. Diabetes Care. 2013 Apr;36(4):823-30. doi: 10.2337/dc12-1477. Epub 2012 Nov 27. PMID: 23193218; PMCID: PMC3609486.

[12] Wang H, Ge L, Yan Yan Kwok J, Zhang Z, Wiley J, Guo J. A blended mindfulness-based stress reduction program to improve diabetes self-management among people with type 2 diabetes mellitus: a mediation effect analysis. Ann Behav Med. 2025 Jan 4;59(1):kaae075. doi: 10.1093/abm/kaae075. PMID: 39657759.

[13] Kaito F. Studying the effects of mindfulness and stress management on glycemic control in patients with diabetes. J Diabetes Clin Prac. 2025;8:290.