

Effects of Mindfulness-Based Stress Reduction on Blood Pressure (MBSR) Among Patients with Type-2 Diabetes - A Randomised Pilot Study

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Abstract

Hypertension affects approximately 70 percent of patients with diabetes. Diabetic mellitus with elevated blood pressure is a stressful health problem for middle aged and older adults. Mindfulness-Based Stress Reduction (MBSR) has been shown to decrease the blood pressure for individual with diabetes. Therefore the randomised pilot study was conducted to evaluate the effects of MBSR on blood pressure among type 2 diabetes, aged 35-60 years in a selected rural community, Bangalore. Forty participants were selected by simple random sampling method and equally randomised into experimental and control groups. Blood pressure was measured at baseline and at the end of the intervention. Experimental group had undergone MBSR training session, whereas control group did not receive any training. The study results showed that MBSR was effective in reducing the systolic blood pressure and it was found statistically significant ($p=0.018$). But there was no change in diastolic blood pressure in both groups. Hence it was statistically not significant ($p=0.119$). The study concluded that MBSR programme was effective in controlling blood pressure of individuals with type 2 diabetes.

Diabetic mellitus is a major health problem virtually affecting every aspects of a person's life including their physical and mental health. Hypertension commonly occurs in individuals with type 2 diabetes which results in significant morbidity in the form of congestive heart failure, stroke and increases the risk of premature mortality thus reducing quality of life and elevating health care cost.

Therefore effective management is required to control blood pressure of persons with type 2 diabetes. The effective management includes drug therapy, lifestyle modification, weight management, relaxation therapy and meditation. MBSR is the mind-body-based therapy which promotes positives mindset and creates a feeling of wellbeing. Moreover this technique is cost effective, has no side effects and act as an effective tool to reduce blood pressure. The present study was conducted to evaluate the effects of MBSR among patients with type 2 diabetes.

Objectives

Objectives of the study were to:

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1. Assess the blood pressure of patients with type 2 diabetes in experimental and control groups.
2. Evaluate the effects of MBSR on blood pressure among subjects with type 2 diabetes.

Methodology

The study adopted quantitative interventional approach with true experimental pre-test post-test design. A survey was conducted to identify the samples in selected rural community using interview schedule. Selection criteria of the study samples were patients with type 2 diabetes, both male and female, aged 35-60 years, whose systolic blood pressure ranged between 140-159 mm Hg and diastolic blood pressure 90-99 mm Hg and participants were with or without anti-hypertensive medication. Forty subjects were selected through simple random sampling technique and they were randomised into experimental group ($n=20$) and control group ($n=20$). Informed consent was obtained from each participant. The study was delimited to participants who have cardiac and renal diseases.

Semi structured questionnaire was used to collect the baseline data. Blood pressure was measured using mercury sphygmomanometer. For measuring their blood pressure, participants were asked to sit

quietly in chair at 5 minutes and three BP readings were taken on their right arm each for 1 minute intervals. All measurement was recorded and the average of the three measures was calculated for pre-test and post-test. The content and language validity were done. The calibration was done for BP device. The experimental group was given 8 weeks of MBSR programme and consisted of mindfulness breathing, body scan, sounds, and thoughts. The control group did not receive any intervention. Post-test was done at end of the intervention. At the end of the study control group participants were also taught about MBSR by the investigator. Of the 20 participants in the experimental group, 2 did not complete the intervention. SPSS 16.0 version was used for statistical analysis of the data.

Results

Subjects characteristics: Majority of subjects in the experimental group (38.89%) and in the control group (30%) belonged to the age group of 45-49 years and all were married (100%) in both experimental and control groups. Majority of the subjects (61.11%) in the experimental and control groups (60%) were female. With regard to education, in the experimental group 61.11 percent had primary education and in the control group 50 percent had primary education; i.e. 66.67 percent in the experimental group and 55 percent in the control group had their occupation as coolie. 88.89 percent subjects in the experimental group and 80 percent in the control group were living in nuclear family and 77.48 percent in the experimental group and 80 percent in control group were having mixed diet.

As for addiction, 55.56 percent in experimental group and 60 percent in control group were non-smokers. In the experimental group 5.56 percent

were smokers and 38.89 percent were ex-smokers, whereas in the control group 10 percent were smokers, and 30 percent were ex-smokers. Minimum number of subjects in the experimental group i.e. 8 out of 18 had habits of alcohol drinking and in the control group 6 out of 20 had this habit. In the experimental group majority of subjects i.e. 9 out of 18 (50%) and in the control group 11 out of 20 (55%) were diagnosed to have hypertension. With regards to use of anti-hypertensive medication majority i.e. 12 out of 18 (66.67%) in experimental group and 14 out of 20 (70%) in the control group were taking drugs. In both experimental and in the control groups, none of them were aware about mindfulness-based stress reduction therapy and were not practicing any other stress management techniques.

Table 1 and Fig 1 show the paired and unpaired t test value of systolic blood pressure score in experimental and control groups. In experimental group mean pre-test systolic blood pressure score ($M=144.56$, $SD=4.105$) was higher than post-test systolic blood pressure score ($M=143.22$, $SD=3.828$). There was a significant reduction in systolic blood pressure ($t_{(17)}=3.117$, $p=0.006$) among subjects in the experimental group.

In experimental group mean post-test systolic blood pressure score ($M=143.22$, $SD=3.828$) was lower than in the control group mean post-test blood pressure score ($M=145.33$, $SD=4.172$). There was a significant reduction in systolic blood pressure ($t_{(36)}=2.487$, $p=0.018$) among subjects in the experimental group.

Table 2 and Fig 2 show paired and unpaired t test value of diastolic blood pressure score in experimental and control group. In the experimental group mean pre-test diastolic blood pressure ($M=94.33$, $SD=3.447$) was higher than mean post-test diastolic blood pressure score ($M=93.67$, $SD=3.834$). There was no significant reduction in diastolic blood pressure ($t_{(17)}=1.374$, $p=0.187$) among subjects in experimental group. In experimental group mean post-test diastolic blood pressure score ($M=93.67$, $SD=3.834$) was lower than the control group mean post-test blood pressure score ($M=95.4$, $SD=2.910$). But there was no significant reduction in diastolic blood pressure ($t_{(36)}=1.595$, $p=0.119$) among subjects belonging to both experimental

Table 1: Overall systolic blood pressure score of study subjects (n=38)

Systolic BP	Experimental group (n=18)		Test of significance ^A df=17	p value	Control group (n=20)		Test of significance ^{AA} df=36	p value
	Mean	SD			Mean	SD		
Pre-test	144.56	4.105	3.117	0.006*	143.00	5.145	2.487	0.018*
Post-test	143.22	3.828			145.33	4.172		

^A - paired t test value ^{AA} - independent t test value * - significant

Table 2: Overall diastolic blood pressure score of type 2 diabetes

Diastolic BP	Experimental group (n=18)		Test of significance ^A df=17	p value	Control group (n=20)		Test of significance ^{AA} df=36	p value
	Mean	SD			Mean	SD		
Pre-test	94.33	3.447	1.374	0.187 NS	95.00	2.497	1.595	0.119 NS
Post-test	93.67	3.834			95.33	2.910		

^A - paired t test value ^{AA} - independent t test value NS- non significant

Figure 1: Mean pre-test, post-test systolic blood pressure in the experimental and control group (n=38)

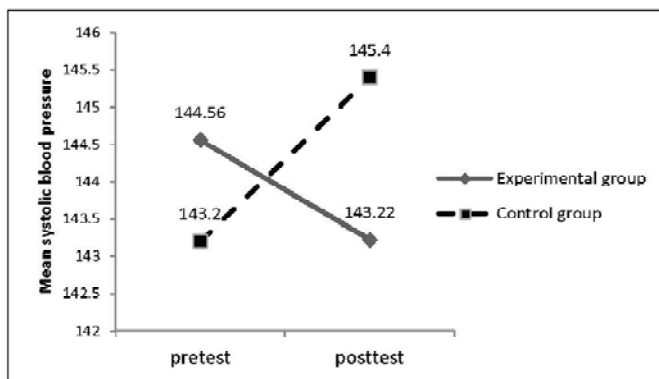
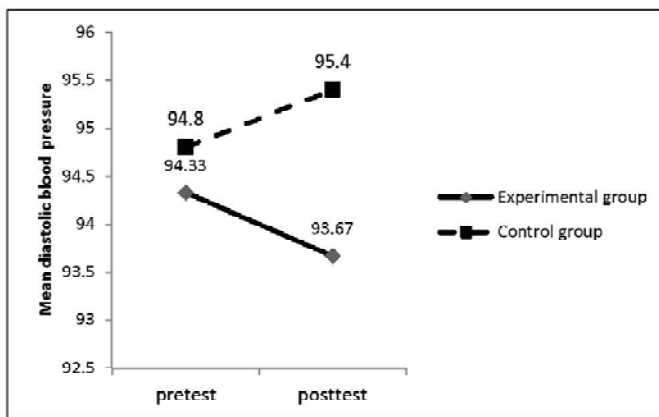


Figure 2: Mean pre-test, post-test diastolic blood pressure of subjects in experimental and control groups



and control groups.

Discussion

The pilot study results reported that MBSR is effective in lowering blood pressures of patients with type 2 diabetes. This findings were consistent with Palta P et al (2012) who reported that MBSR results in lower mean systolic and diastolic blood pressure readings of urban older adults those who participated in MBSR intervention programme compared to social control group. Carlson et al (2007) found that MBSR intervention shows there was reduction in blood pressure for prostate and breast cancer patients. Rosenzweig et al (2007) reported that MBSR programe was effective for reduction of mean arterial pressure by 6 mmHg ($p=0.009$). Another study by Oberg et al (2013) reported that changes in outcomes were clinically and statistically significant, including reductions in mean systolic and diastolic blood pressure between week 1 and week 11 ($p=0.0001$ and $p=0.0004$ for systolic and diastolic, respectively, by paired, 2-sided t-tests). These findings are congruent with those of Chen et al (2013) who reported that Systolic blood pressure was reduced more after the intervention in the meditation group than in the control group, with an aver-

age reduction of 2.2 mmHg among nursing students.

Recommendation

Large sample size can be used to provide the evidence of reduction of blood pressure as MBSR outcomes. Blood glucose can also be seen for MBSR effectiveness in patients with type 2 diabetes; MBSR outcomes may be tested on selected psychological parameters too.

Conclusion

It is concluded that MBSR improves blood pressure outcome among patients with type 2 diabetes. Moreover, this was a pilot study conducted among small sample. Hence the study emphasised on outcome measures of blood pressure of type 2 diabetes. The study results provide evidence that MBSR may be an appropriate complementary treatment for individual with high blood pressure and may help to improve quality of life.

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