

Research Article

Effectiveness of mindfulness based mental fitness training: an impact evaluation study

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Received: 14 June 2016

Accepted: 02 July 2016

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ABSTRACT

Background: Mindfulness-based mental fitness training (MBMFT) based on Vipassana is a secular, non-religious method found to be useful in reducing stress, anxiety and depression in a variety of population. Studies have revealed that an increasing percentage of population experiences high stress. The present study was conducted to evaluate impact of a mindfulness-based mental fitness training (MBMFT) programme on levels of stress and resilience among students of school in an industrial establishment.

Methods: Sixty nine students aged 18-20 years of an industrial establishment who volunteered and met the inclusion criteria were included in the study. The participants were randomly divided into two groups, group I (n=35) were given 8 weeks of Mindfulness-Based Mental Fitness Training, and group II (n=34) followed the normal curricula of the school. Questionnaires were completed on psychological well-being and mindfulness by the participants initially and after 08 weeks.

Results: The students who underwent MBMFT (group-I) had significantly ($p < 0.05$) higher FFMQ scores at 08 weeks (130.10 ± 9.69) as compared to baseline scores (122.55 ± 12.7) and scores of the group II (117.95 ± 10.1). Group I students also had lower perceived stress scores at the end of 08 weeks of MBMFT. Personal resilience was assessed only for Group-I using Personal Resilience Questionnaire (PRQ). The PRQ score increased significantly ($p = 0.000$) from mean baseline score of 157.76 ± 10.14 to 166.31 ± 13.01 at the end of 8 weeks.

Conclusions: Mindfulness based Mental Fitness Training is an effective method which can be used to enhance the ability of personnel to combat stress. Future large scale multi centric research is required to further validate the effectiveness of MBMFT and to assess feasibility of inclusion of MBMFT as regular aspect in training institutions.

Keywords: Mindfulness, Mindfulness based mental fitness training, Resilience, Stress

INTRODUCTION

Mindfulness may be thought of as focusing one's attention in a nonjudgmental or accepting way on the experience occurring in the present moment.¹ It is usually defined as being aware of and attending to present internal or external stimuli, or as a particular quality of consciousness that can be enhanced and cultivated through the practice of mindfulness meditation.²⁻⁴ In recent past, mindfulness has received great interest from clinicians and researchers because it improves the ability to be mindful in daily life which in turn promotes psychological wellbeing. Interventions utilizing

mindfulness techniques have shown efficacy for treating and coping up with a variety of physical and medical conditions, including chronic pain, fatigue and stress.⁵⁻¹¹

Studies of occupational stress carried out in industrial units have revealed that, an increasing percentage of workers experience high stress.^{12,13} People working in industrial establishments go through many tough situations which are demanding in nature and require skills to withstand stress and improve resilience. Thus, though there are studies documenting the high prevalence of stress in industrial workers, there is dearth of literature

regarding effective stress reduction interventions in this special population.

A study conducted by University of Pennsylvania, provided Mindfulness-based Mind Fitness Training (MMFT) to U.S. Marines before deployment. The results indicate that MMFT provides “psychological prophylaxis” or protection from cognitive and emotional disturbances, even in high-stress situations.¹⁴ However, there is a dearth of similar studies on effects of mindfulness based practices in Indian population. Therefore, we conducted a study to explore the effectiveness of Mindfulness-Based Mental Fitness Training (MBMFT) programme on level of stress and resilience among students of a school in an industrial establishment.

METHODS

Students of a school in an industrial establishment were recruited as participants in June 2014. Information regarding the study was provided to the students through lectures and one-to-one discussion. Students willing to participate were enrolled in the study using the following inclusion and exclusion criteria.

Inclusion criteria

- The trainee should be a regular student.
- The trainee should have completed at least two months and expected to stay in the school for at least six months from the date of implementation of the programme.

Exclusion criteria

- A past history of any type of physical/ mental illness.
- Insufficient understanding of the English language.

Sixty nine students volunteered and met the criteria for inclusion in the study. All students willing and fulfilling the eligibility criteria were included in the study after obtaining a written informed consent. The participants were divided into two groups as per allocation ratio of 1:1, however, as total participants were 69 Group-I (n=35) had 01 participant more than Group-II (n=34). Group-I was given Mindfulness-Based Mental Fitness Training (MBMFT) for 08 weeks and Group-II continued to follow the normal curriculum without MBMFT. The study was approved by the Institutional Ethics Committee.

Procedure and MBMFT

At baseline, before the intervention, all participants completed the questionnaires. After dividing the study subjects into two groups, participants of Group-I (n=35) were subjected to MBMFT and the Group-II (n=34) followed the normal curricula of the school. This training curriculum was developed by the authors and designed

for a period of eight weeks with half an hour of formal practice daily. The curriculum of the training programme was based on Vipassana with certain modifications and addition of informal practice along with inputs from related programmes as prevalent worldwide. The formal practice included 30 minutes session (guided instructions) five days a week and spread over eight weeks. In addition, one-to-one interactions with the instructor and video sessions were also a part of the training. The informal practice comprised of mindful eating, standing, walking, yoga and other significant daily activities.

The formal and informal practices were mandatory part of the MBMFT. This training was conducted independently of students’ study curricula during library period for a period of 08 weeks (July-September 2014). After 08 weeks at the end of the training, participants in both the groups were asked again to complete the questionnaire sets including Perceived Stress Scale (PSS) and Five Factor Mindfulness Questionnaire (FFMQ).

Study measures

Participants’ demographic and lifestyle information (age, years of service, total number of members in the family, smoking and drinking habits, physical activities and sleep pattern etc) were collected at baseline. The outcome measures were collected at the two time points (baseline and post-intervention) and the adherence was measured with daily practice log and attendance in the classroom practice. In addition, all the individuals were also given a life event card to assess the impact of any major or minor life events during the course on study outcome.

Outcome measures

Stress

Participants’ level of stress was measured using the Perceived Stress Scale (PSS).^{15,16} PSS is a 10 item likert scale which measures the events/ feelings/ thoughts related to stress in the last one month. The scale is used to assess the degree to which life in the past month was perceived as stressful, unpredictable and uncontrollable on a five-point scale.

Mindfulness

Five Factor Mindfulness Questionnaire (FFMQ) was used to assess mindfulness.¹⁷ It is a 39 items scale with five facets namely Observing (8 items), Describing (8 items), Acting with awareness (8 items), Non-judging of inner experience (8 items) and Non-reactive to inner experience (7 items). The total score ranges from 0-195. The scale has been validated internationally and found to have good psychometric properties.¹⁸

Stress resilience

Personal Resilience Questionnaire (PRQ) was used to measure resilience to withstand stress among the participants.¹⁹ It is a 42 item likert scale with six sub scales namely sense of purpose, positive mental attitude, connect with others, determination, taking control and looking after yourself and each sub scale is having 7 items.

Statistical analysis

Quantitative characteristics are reported using means and standard deviations and categorical characteristics using percentages. First, we examined the background characteristics for differences between the groups. Thereafter, the Mean baseline and post-MBMFT scores of the two groups were compared using Mann-whitney U

test and Wilcoxon rank sum test. All analyses were carried out using Statistical Package for Social Sciences (SPSS: version 17.0).

RESULTS

The baseline characteristics of the subjects are summarized in Table 1. The mean age of subjects in Group-I and Group-II were 19±0.96 and 19.05±0.85 years respectively (p=0.847).

There were no significant differences between the two groups (I & II) with regards to baseline characteristics including age, smoking habits, alcohol use/abuse, total duration of sleep per day, total duration of physical activity per week and help and support score (as measured by help and support from colleagues, family, friends and relatives).

Table 1: Baseline characteristics.

Variable	Group I Mean±SD or (%) (n=35)	Group II Mean±SD or (%) (n=34)	p value
Mean Age	19.0±0.96	19.05±0.85	0.847
Smoking			
No	29 (82.7)	32 (94.7)	0.223
Yes	6 (17.3)	2 (5.3)	
Alcohol			
No	28 (79.3)	29 (84.2)	0.488
Yes	7 (20.7)	5(15.8)	
Social and Personal Characteristics			
Help &Support Score	23.66±3.02	23.74±2.68	0.924
Hours of Sleep per day	5.07±1.31	5.26±1.28	0.615
Hours of physical activity per week	4.41±2.19	6.04±3.63	0.058
General Health Questionnaire (GHQ-28)			
Score ≤4	24 (68.9)	22 (63.1)	0.684
Score >4	11 (31.1)	12 (36.9)	

Table 2: FFMQ and PSS scores at baseline and after 08 weeks.

Test	Group I (N=35)			Group II (N=34)		
	Baseline (Mean±SD)	After 08 weeks (Mean±SD)	p value	Beginning of study (Mean±SD)	After 08 weeks (Mean±SD)	p value
FFMQ						
Observe	23.41±5.21	28.38±4.44	0.000	22.11±7.56	23.0±6.02	0.515
Describe	27.07±5.96	27.69±3.64	0.586	26.47±4.89	24.79±3.24	0.053
Act with awareness	26.9±5.96	27.03±4.5	0.892	26.58±7.03	26.63±6.79	0.060
Non-judging	24.38±5.33	24.21±3.32	0.876	24.11±6.57	24.74±6.21	0.462
Non-react	20.79±3.64	22.79±3.68	0.022	19.0±3.57	18.79±4.83	0.817
Overall	122.55±12.7	130.10±9.69	0.001	121.26±9.8	117.95±10.1	0.089
PSS	19.10±6.26	15.31±5.31	0.011	16.53±4.82	18.37±7.14	0.279

In addition, overall mental health status was also assessed by using General Health Questionnaire (GHQ-28) and no significant difference was observed in the baseline scores of the two groups.

In order to assess the impact of mindfulness training, mean FFMQ and PSS scores of the same group were

compared at baseline and after 08 weeks (Table 2). In Group-I, the mean overall FFMQ score was found to be significantly higher ($p=0.001$) after 08 weeks of training (130.10 ± 9.69) as compared to the baseline score (122.55 ± 12.7) assessed at the beginning of the study.

Table 3: Comparison of FFMQ and PSS scores between two groups at baseline and after 08 weeks.

Test	Baseline			After 08 weeks		
	Group I Scores (Mean±SD)	Group II Scores (Mean±SD)	p Value	Group I Scores (Mean±SD)	Group II Scores (Mean±SD)	p Value
PSS	19.10±6.26	16.53±4.82	0.135	15.31±5.31	18.37±7.14	0.136
FFMQ						
Observe	23.41±5.21	22.11±7.56	0.480	28.38±4.44	23.0±6.02	0.001
Describe	27.07±5.96	26.47±4.89	0.719	27.69±3.64	24.79±3.24	0.007
Act with awareness	26.9±5.96	26.58±7.03	0.162	27.03±4.5	26.63±6.79	0.805
Non-judging	24.38±5.33	24.11±6.57	0.875	24.21±3.32	24.74±6.21	0.702
Non-react	20.79±3.64	19.0±3.57	1.000	22.79±3.68	18.79±4.83	0.007
Overall	122.55±12.7	121.26±9.8	0.709	130.10±9.69	117.95±10.1	0.000

Table 4: Change in personal resilience among Group-I subjects.

PRQ	Baseline (Mean±SD)	After 08 weeks (Mean±SD)	p value
Sense of purpose	27.17±2.56	28.0±2.59	0.092
Positive mental attitude	25.52±2.59	27.38±2.82	0.006
Connect with others	26.17±2.83	27.03±2.41	0.138
Determination	26.24±2.57	27.76±3.24	0.012
Taking control	25.83±2.38	28.0±2.48	0.001
Looking after yourself	26.83±1.98	28.14±2.88	0.022
Overall	157.76±10.14	166.31±13.01	0.001

Further, when mean scores of all the five facets of mindfulness questionnaire were compared individually only 'Observe' and 'Non-reactivity to inner experience' sub scales were found to be higher than the baseline scores ($p=0.000$ and $p=0.022$ respectively). The mean overall and subscale FFMQ scores of Group-II were also compared, but no significant difference was found between baseline scores and scores after 08 weeks ($p>0.05$). Similarly, change in perceived stress was compared and the mean PSS score (15.31 ± 5.31) at 08 weeks was found to be significantly lower ($p=0.011$) from the baseline score (19.10 ± 6.26) in Group-I but no significant PSS score difference was observed in Group-II ($p>0.05$).

To further evaluate the effectiveness of mindfulness training we compared the FFMQ and PSS scores between the two groups (Group-I and Group-II) (Table 3). The baseline FFMQ and PSS score in both groups were similar ($p>0.05$). After 08 weeks of mindfulness training the perceived stress levels in Group-I (PSS

score= 15.31 ± 5.31) was lower than Group-II (PSS score= 18.37 ± 7.14), but the difference was not found to be statistically significant ($p = 0.136$).

On comparison of five facet mindfulness questionnaire (FFMQ) scores at the end of 08 weeks, the mean overall scores of Group-I (130.10 ± 9.69) was found to be much higher than the Group-II score (117.95 ± 10.1) ($p=0.000$). On comparison of individual FFMQ sub scales, group-I subjects had higher scores than Group-II subjects for three sub scales out of five namely, 'Observe', 'Describe' and 'non reactivity to inner experience' ($p<0.05$).

Personal resilience was assessed only for Group-I using Personal Resilience Questionnaire (PRQ). The PRQ score increased significantly ($p=0.001$) from mean baseline score of 157.76 ± 10.14 to 166.31 ± 13.01 at the end of 08 weeks.

Further, scores of all the six sub scales of PRQ were also compared and it was found that the four out of six

subscales namely, positive mental attitude, determination, taking control and looking after yourself subscales showed significant changes after the training ($p < 0.05$). Scores of subscale 'sense of purpose' and connect with others though statistically not significant ($p > 0.05$) had higher scores at the end of 08 weeks as compared to baseline (Table 4).

DISCUSSION

Mindfulness Based Mental Fitness Training, based on Vipassana, is one of India's most ancient techniques of meditation and was taught by Lord Buddha as a universal remedy for all ills. Vipassana, which means to see things as they really are, is a secular, non-religious method which in different populations has shown to improve psychological wellbeing and reduce stress, anxiety and depression.²⁰

In many centers it is taught as a ten-day concentrated course during which participants are expected to follow a prescribed code of discipline. The rigorous course probably deters personnel from deriving benefit from the program, and hence, in the West mindfulness is modified to a twenty hour course spread over eight weeks. In the present study we also gave students with specially designed mindfulness-based mental fitness training (MBMFT) for a period of eight weeks. The aim of present study was to assess effectiveness of MBMFT on level of stress and resilience among trainees of a school in Industrial establishment.

In present study we found that Group of students who were subjected to MBMFT had significant reduction in PSS scores and these scores were much less than students who did not receive between groups of MBMFT. However, this difference did not achieve statistical significance which may be due to small sample size. The role of MBMFT in stress reduction is now well established. Bazarko et al. in their nonrandomized study of 36 nurses found significant improvements in general health ($P < 0.01$), perceived stress ($P < 0.001$) and decreased work burnout ($P < 0.001$) after intervention of 6 weeks mindfulness training.²¹

de Vibe et al also found significant stress reduction after mindfulness training in his sample of 144 undergraduate students from two universities.²² Manoj and Rush, reviewed 17 studies on mindfulness-based stress reduction and its efficacy in decreasing stress in healthy individuals. In all studies they were able to find positive effects in psychological or physiological outcome measures related to stress.²³

Mindfulness training programs have been found to not only reduce psychopathological indicators and stress but also improve overall wellbeing of an individual.^{24,25} Mindfulness is said to achieve this in two different ways. Firstly, Mindfulness is hypothesized to improve health and well-being indirectly by a greater capacity of self-

regulation. Secondly, mindfulness is believed to enhance well-being directly since mindfulness is regarded to be high quality state in itself, associated with, strength, happiness and simplicity.^{2,3}

In order to assess levels of mindfulness to determine whether individuals engaged in practice of mindfulness are in fact becoming more mindful over time, and if so, whether these increase are responsible for the positive outcomes observed, Baer et al. conducted exploratory factor analysis of the combined item pool from all the available mindfulness questionnaires and found that a five-factor structure appeared to capture several distinct but related underlying dimensions.¹⁷ Items of the highest loading of each of the factors were combined to form the five facet mindfulness questionnaire.

Present study subjects were also administered five facet mindfulness questionnaire. Individuals with MBMFT had significantly higher Overall, Observe, Describe, and Non-reactivity to inner experience scores as compared to the other group (Non-MBMFT group).

Flook et al in their randomized controlled trial of elementary school teachers from different public elementary schools found significant improvements in intervention group observer-rated classroom behavior after 8 weeks of MMFT.²⁶ Similarly, Tanner et al and Joseffson et al have also reported significant change in FFMQ 'Describe' sub scale.^{27,28}

Resilience is best defined as successful adaptation to adverse circumstances. In general, the concept of resilience reflects desire for great optimism under adversity. In other words, optimism accompanies resilience in stressful situations.²⁹ The relationships between optimism and psychological well-being have been observed in case studies as well as longitudinal studies.³⁰

To determine the change in resilience the group of students undergoing MBMFT were administered PRQ before and after 08 weeks of MBMFT. The overall PRQ scores increased significantly with 08 weeks of MBMFT training. Johnson et al. examined the effect of mindfulness training on resilience mechanisms in active-duty Marines preparing for deployment and found enhanced recovery after stressful training as compared to baseline after 08 weeks mindfulness training.³¹ Similarly, Pidgeon et al in his sample of 141 university students also found significant positive relationships between mindfulness and resilience.³²

Mindfulness training, by decreasing emotional quotient and increasing the cognitive domains, tries to modify the individual's perception of stressful thoughts and events. This in turn helps the individual to view situations and thoughts in a non-judgmental, nonreactive, and accepting manner. In simple words, mindfulness training leads to improved psychological wellbeing. In context of Armed

forces, studies on mindfulness training have been conducted in the US Marines. These studies have not only substantiated a causal relationship between increased mindfulness and positive health outcomes but have also concluded that stress recovery can be modified in healthy individuals prior to stress exposure.³¹

There were several limitations of present study which need to be acknowledged. This study was conducted on a small group of subjects view operational and feasibility factors. The study did not involve follow up of the participants; hence, long term impact of mindfulness training could not be assessed. This was a questionnaire based study and the various measures used for assessment were self-reported. Further, use of physiological, biochemical and neural markers for observing impact of the training is required.

CONCLUSION

In conclusion, Mindfulness-based Mental Fitness Training is a well-established training modality that has shown to reduce stress, depression, and anxiety. This was a small study highlighting the effectiveness of the MBMFT in personnel working in industrial establishments. We recommend a larger multi-centric study to further validate the effectiveness of MBMFT and to assess feasibility of inclusion of MBMFT as regular aspect in schools and training establishments.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Pawar AA, Panda JK, Bobdey S. Effectiveness of mindfulness based mental fitness training: an impact evaluation study. *Int J Res Med Sci* 2016;4:3433-9.