Effect of yoga intervention on mindfulness, perceived stress, emotion regulation and affect: a study on senior managers in an Indian multinational corporate

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Abstract: Psychological distress is highly prevalent among leadership professionals. Workplace yoga interventions to enhance psychological wellbeing and further follow-up studies are limited. We studied the effect of a residential five days yoga intervention and later follow-up after three months of home practice on 102 senior level managers of Oil and Natural Gas Corporation (ONGC). They were assessed for various psychological constructs like mindfulness, emotion regulation, positive and negative affect and perceived stress. Results of linear mixed effects model showed that all the variables had significantly influenced the perceived stress, except for emotion regulation. Findings suggest that intervention is effective in addressing the stress of senior managers by improving mindfulness, positive affect, and better emotion regulation strategy, but due to lack of supervised guidance after the program, there is a high chance of further relapse, which needs further attention to maintain an environment of sustained wellbeing.

Keywords: yoga; stress; leaders; mindfulness; emotion regulation.

1 Introduction

Stress in an organisational setup is common, and also among people who are at managerial positions, who have the responsibility of fulfilling organisational goals and also delegating work among employees, seeking their cooperation and support. Placed in such critical positions, their jobs demand them to maintain a delicate workplace balance. Situation can become more challenging when the nature of a company’s work involves high risk operations. Oil and Natural Gas Corporation (ONGC) is one such Indian multinational corporate, where the senior level managers encounter various challenging workplace situations and experience stress. Even though there are many stress management programs offered in corporate sectors, there are limited scientific works on effectiveness of stress management program in such challenging work place setups.

Exploring new techniques, such as mindfulness, can lead to the development of novel methods for enhancing employee wellbeing at work (Schultz et al., 2015). Mindfulness studies have grown exponentially over the past three decades. However, investigation into the beneficial effects of mindfulness interventions at workplace is still in infancy stage (Jamieson and Tuckey, 2017). Research suggests that mindfulness could be a trait that buffers against burnout (Taylor et al., 2016). Mindfulness meditation can be an on the spot intervention which can be used in specific work situations (Hafenbrack, 2017). One key mechanism by which mindfulness has its beneficial effects is by promoting effective emotion regulation (Roemer et al., 2015). Mindfulness can facilitate emotion regulation at both explicit and implicit levels (Remmers et al., 2016). Emotional intelligence is known to affect the leadership skills (Pooja and Kumar, 2019).

Like mindfulness based interventions yoga is also another popular method of addressing stress in workplace setups. Yoga is shown to have a positive effect on health in the workplace, particularly in reducing stress (Puerto Valencia et al., 2019). Meditation-based intervention for executives in a large public sector company showed a reduction in perceived stress and also improvements in physical indicators of stress (Mulla et al., 2017). However, studies explaining the effect of yoga in various workplace setups are still limited.
In this study, we tried to study the effect of yoga based intervention on mindfulness, stress, emotion regulation and affect on the senior managers of the ONGC, a large multinational public sector undertaking in India.

2 Literature review

Estimates suggest that working adults, on an average, spend about one third of their waking life at work (Harter et al., 2002). Previous studies have shown psychological distress as highly prevalent among working adults (Hilton et al., 2010; Larsen et al., 2010). Physical manifestations of stress include musculoskeletal pain, headaches, constant fatigue, sleep disorders, gastrointestinal disorders, cardiovascular illnesses, and substance use, while its psychological manifestations include lack of concentration, negative affect, low self-esteem, aggression among others (Constantino et al., 2013).

Managers consider the most important sources of work stress to be lack of control and work life balance. Work relationships, control, nature of job and communications were found to be significantly related with work engagement and job satisfaction (Gupta and Tyagi, 2009).

Work related factors are shown to have significant and differential relationship with perception of quality of work life among employees of public and private sectors and entrepreneur’s groups (Sinha and Subramanian, 2013). Moment demand is identified as a major factor contributing to job stress among officers and supervisors (Sidhu et al., 2019).

Stress is experienced in response to a range of physical, occupational and emotional stimuli. Within manageable parameters one’s sense of well-being is maintained, but if these stimuli go beyond normal limits, they become stressors.

There are many interventions available to handle workplace stress. Since stress is more appraised in the mind, even though it may have its sources at physical or mental levels, many mindfulness based interventions are used to handle workplace stress. It has been recognised that mindfulness can be used for enhancing employee wellbeing at work (Schultz et al., 2015). Preliminary research in embedding mindfulness interventions into the workplace appears to show promising results – few examples are stress reduction and increasing job satisfaction among workers (for a review, see Good et al., 2015). Few studies have provided theoretical accounts of how mindfulness might improve task performance, physical health, and psychological health (Dane, 2011; Glomb et al., 2011). Mindfulness is shown to act as a protective factor even in non-optimal work environments and appears to provide a potential pathway to wellness at the workplace (Schultz et al., 2015). One of the main areas of interest is the use of mindfulness-based interventions (MBIs) to reduce the effects of stress and distress in working adults who are at risk of higher stress due to the nature of their occupation or work situation (Irving et al., 2009; Jacobs and Blustein, 2010).

Yoga based interventions have mindfulness as an inherent component. Cyclic meditation (CM) is one such practice which requires mindfulness throughout the practice session. It involves a combination of a set of ‘stimulation’ and ‘relaxation’ practices, based on the knowledge from the ancient yoga texts that suggests that such a combination may be especially helpful to reach a state of mental equilibrium (Sarang and Telles, 2006). The current evidence base on CM shows that the practice of CM significantly
reduces oxygen consumption and energy expenditure to a greater degree (32.1%) than a comparable period of supine rest (Sarang and Telles, 2006). The CM practice has also been shown to decrease occupational stress levels and baseline autonomic arousal (Vempati and Telles, 2000). Practice of CM has shown a significant reduction in stress levels, significant improvement in two positive subscales and reduction in two negative subscales on PANAS (Hankey, 2013). A 5-day intervention of CM practice found a significant reduction in five negative mood subscale measures of POMS. The study found there were improvements in positive affect, self-esteem score and decrement in negative affect scores after the self management of excessive tension (SMET) training program (Rabindra et al., 2014). Following the practice of CM, all the domains of General Health Questionnaire (GHQ) were improved (Maharana et al., 2014). A controlled study on the immediate effect of a single session of CM suggested higher levels of state mindfulness following the practice (Vinchurkar et al., 2014).

2.1 Purpose of the study

In this current study, CM was used an intervention in a five days residential stress management program. There was also a follow-up after three months. Studies on the effect of such yoga-based interventions on corporate leaders are limited and hence this study was conducted, to evaluate the effect of a yoga-based intervention on mindfulness for working adults, more specifically for corporate leadership professionals. The study examines the effect of yoga intervention on mindfulness, emotion regulation, perceived stress, positive affect and negative effect in leadership professionals. The aims of the study were:

1. Examine the effect of yoga based intervention on mindfulness in working professionals.
2. Examine the effect of yoga based intervention on perceived stress, positive and negative affect and emotion regulation in working professionals.
3. Examine the follow-up effect of the residential intervention, after three months of home practice.

2.2 Rationale of the study

Mindfulness intervention studies in workplace are burgeoning area of research with significant practical implications. Studies focusing on yoga based interventions to promote mindfulness are limited. In one of the mindfulness intervention studies, an unexpected finding was the strong association between the mindful yoga form of practice and changes in other variables, including increased mindfulness skills, reduced symptoms and improved wellbeing. Given that mindful yoga was practiced on fewer days and for fewer total hours than the other formal practices, these results are striking and bear further investigation (Carmody and Baer, 2008). In the field of mindfulness research, mind or thought control is emphasised, but the role of body regulation has often been underemphasised. In practices like integrated body mind technique or yoga, mind-body interaction facilitates the mindfulness process and outcomes (Tang and Tang, 2015). Cyclic meditation (CM), which is a yoga based intervention, involves awareness over various bodily movements. This has an advantage of having an anchor at the physical
body, which makes it possible to keep the mind focused on the bodily changes, and avoid distractions. CM has been reported to enhance mindfulness (Vinchurkar et al., 2014) and mindfulness is known to have an impact on emotion regulation, stress, and affect variables. In this study, we hypothesise that cyclic meditation intervention will influence psychological constructs like mindfulness, perceived stress, emotion regulation, and positive and negative affect scores.

3 Method

3.1 Participants

3.1.1 Source of participants

Participants were recruited from a large multinational public sector undertaking, ONGC. We adopted a convenience sampling procedure. Program details were shared with senior level leadership professionals in the organisation and the sample was drawn from senior executives who voluntary opted for the program. However, the sample had representation from various states across India, like Andhra Pradesh, Assam, Delhi, Goa, Gujarat, Maharashtra, Tamil Nadu, Tripura, and Uttarakhand. Participants were sent in four consecutive batches, spanning across two months.

3.1.2 Sample size

105 participants reported for the residential program located in a Yoga university setup at Bengaluru. There were three dropouts due to personal exigencies during the study. 102 senior level leadership professionals with a mean age of 53.85 years and ranging from 30 to 60 years participated in the study and were given five days residential yoga-based stress reduction program. Both males and females who volunteered for the program were included in the study. Later they were asked to continue the practices at home and assessments were made at the baseline, after the residential program and following three months home practice. Out of the 102 participants who attended the full 5-day residential intervention, 83 participants provided follow-up data after three months.

3.2 Design

Repeated measures design with a single group followed at three time points, baseline, after the intervention, and after the follow-up for three months.

3.3 Assessments

They were assessed for mindfulness, emotion regulation, positive and negative affect, and perceived stress, apart from the demographic details. Mindfulness was measured using the mindfulness attention awareness scale (MAAS). MAAS is a 15-item self-reported single-factor scale that is exclusively focused on attention/awareness component of mindfulness construct (Brown and Ryan, 2003). The items are answered on a six-point scale (1 = almost always; 6 = almost never) on which higher scores are an indication of a
higher trait mindfulness. The MAAS has been validated in various samples of students (alpha = 0.82) and adults from the general community (alpha = 0.87).

Emotion regulation was measured using the emotion regulation questionnaire (ERQ). ERQ is designed to assess individual differences in the habitual use of two emotion regulation strategies: cognitive reappraisal and expressive suppression (Gross and John, 2003). The questions involve two distinct aspects on emotional life. One is on the emotional experience, or what you feel like inside. The other is on emotional expression, or how you show your emotions in the way you talk, gesture, or behave. ERQ has ten items and is self-reported on a 7-point scale (1 = strongly disagree; 7 = strongly agree).

Positive affect and negative affect were measured using the positive affect and negative affect schedule (PANAS). PANAS consists of 20 items with two sub-scales and 10-items each measure to assess positive and negative affect. This is measured using a 5-point scale that ranges from very slightly (1) to extremely (5). It can show the relationship between positive and negative affect with personality states and traits. The internal consistency, alpha reported for PANAS ranges from 0.86–0.90 for positive affect and from 0.84–0.87 for negative affect (Watson et al., 1988).

Perceived stress was measured using the perceived stress scale (PSS). PSS is a widely used and well-validated 10-item scale that measures the degree to which the situations in one’s life are appraised as stressful (Cohen, et al.; 1983). A higher score indicates a greater degree of perceived stress. 10-item version of PSS showed adequate internal consistency with a Cronbach’s alpha of 0.67 (Leung et al., 2010).

The assessments were conducted at three different time points. First assessment was done as the baseline on day 1 before commencement of the intervention. Second assessment was done on day 5, on the last day of the residential intervention program. Both these assessments were conducted in a computer lab in supervised settings. The third assessment was done after three months of home practice, following the residential intervention. The same was administered online through a confidential Google form link where in the participants duly submitted their responses on the various questionnaires.

3.4 Intervention

The residential program was termed as SMET and it covered theory sessions that provided conceptual understanding of yoga, stress and its release, concept of executive growth and group dynamics. Theory sessions were followed up with practice sessions on cyclic meditation (CM) technique. Interaction sessions were conducted to address any participant queries. In addition, the program had components on yogasanas (postures), kriyas (cleansing techniques), pranayama (breathing practices) and bhajan (devotional sessions). Simple, healthy nutrient rich vegetarian diet was served.

Following the residential program, participants were expected to continue their daily practice of 35 minutes of cyclic meditation on their own for an additional period of three months. Standardised guided instructions in audio format were provided to facilitate the individual practice.

3.5 Ethical considerations

Signed informed consent form was obtained from participants before beginning of the study, after explaining in detail about the study. Subjects were explained about their
rights to withdraw from the study at any point of time. The current study was approved by the Institute Ethics committee, before commencing the study.

4 Results

4.1 Data extraction and analysis

Data were extracted from the Google form where the responses were originally recorded. Data were cleaned by checking for outliers and missing values. Outliers were checked using boxplot and the Grubbs tests. There were no outliers and all the values fell in the acceptable range. There were no missing data at T1 (baseline) and T2 (after residential intervention) however, after the home practice follow-up, there were 19 drop outs and at T3 only 83 were left for analysis. Various assumption tests were checked for suitability of running parametric tests. We used linear mixed effects models for analysis of repeated measures data, as we found this to be an unbalanced repeated measures design due to dropouts at T3. Linear mixed effects model are considered to be a better method whenever there is an unbalanced repeated measures design (Locker et al., 2007). We used R statistical software for analysis (R Development Core Team, 2018) and its packages nlme for mixed effect modelling (Pinheiro et al., 2012). The raw data, and analysis code used in this study are shared through Open Science Framework (link provided in the acknowledgement section).

4.2 Baseline characteristics

Table 1 contains the descriptive statistics of all the measured dependent variables across T1, T2, and T3. The n was 102 at T1, except for two of the sub domains in the variable emotion regulation questionnaire, where due to some technical reason, we failed to collect the data. The general trend that can be observed is almost all the variables have shown improved in scores after the residential intervention at T2 and tend to diminish after 3-months of follow-up. Table 2 shows the correlation between the measured variables at the baseline.

Table 1 Mean and standard deviations of dependent variables at baseline (T1), after residential intervention (T2), and after three months follow-up (T3)

<table>
<thead>
<tr>
<th>Variable</th>
<th>T1 (n = 102*)</th>
<th>T2 (n = 102*)</th>
<th>T3 (n = 83)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>1 Mindfulness</td>
<td>4.27</td>
<td>0.75</td>
<td>4.62</td>
</tr>
<tr>
<td>2 Reappraisal</td>
<td>29.22</td>
<td>6.18</td>
<td>30.71</td>
</tr>
<tr>
<td>3 Suppression</td>
<td>15.65</td>
<td>5.67</td>
<td>15.69</td>
</tr>
<tr>
<td>4 PosAffect</td>
<td>34.02</td>
<td>6.47</td>
<td>38.3</td>
</tr>
<tr>
<td>5 NegAffect</td>
<td>19.53</td>
<td>7.00</td>
<td>14.52</td>
</tr>
<tr>
<td>6 Perceived stress</td>
<td>15.71</td>
<td>5.33</td>
<td>13.36</td>
</tr>
</tbody>
</table>

Note: *For two sub domains of emotion regulation questionnaire, the n were 86 and 85 at T1 and T2 for reappraisal, and 86 and 86 at T1 and T2 for suppression.
The internal consistencies, Cronbach’s alpha for various questionnaires used in this study were: 0.84 for MAAS, 0.87 for negative affect of PANAS, 0.86 for positive affect of PANAS scale, 0.77 for PSS, 0.69 for ERQ reappraisal, and 0.77 for ERQ suppression.

### Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mindfulness_T1</td>
<td>.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reappraisal_T1</td>
<td></td>
<td>.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[-.17, .25]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suppression_T1</td>
<td>-.17</td>
<td>.18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[-.37, .05]</td>
<td>[-.03, .38]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PosAffect_T1</td>
<td>.30**</td>
<td>.10</td>
<td>-.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[.11, .47]</td>
<td>[-.11, .31]</td>
<td>[-.29, .13]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NegAffect_T1</td>
<td>-.40**</td>
<td>-.11</td>
<td>.01</td>
<td>-.24*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[-.55, -.23]</td>
<td>[-.32, .10]</td>
<td>[-.20, .22]</td>
<td>[-.41, -.04]</td>
<td></td>
</tr>
<tr>
<td>PSS_T1</td>
<td>-.49**</td>
<td>-.05</td>
<td>.01</td>
<td>-.38**</td>
<td>.60**</td>
</tr>
</tbody>
</table>

Note: *Indicates \(p < 0.05\) and ** indicates \(p < 0.01\).

It shows that mindfulness has a significant positive correlation with positive affect, and a significant negative correlation with negative affect and perceived stress. Similarly, negative and positive affect were significantly correlated with perceived stress. Emotion regulation strategies were not found to be correlated with any of the variables.

### 4.3 Linear mixed effects model

Linear mixed effects model was used as our design had some missing values and therefore, we had unbalanced repeated measures data. We performed the one-way repeated measures analysis using linear mixed effect model with time (T1, T2, and T3) and the fixed factor and each of the measured variables as dependent variables one at a time. We used subject as a random factor in all these models. The results are presented in Table 3. Planned contrasts were done using the paired sample t-test to test if the means have changed at T2 and T3 compared to the baseline T1. 0.05 was fixed as the level of statistical significance. The mindfulness score has changed significantly over three assessment points. The change after the residential program compared to baseline was significant, \(t(101) = 5.35, p < 0.001, d = 0.53\), and the increase in the MAAS scores after the follow-up compared to the baseline was significant, \(t(82) = 2.93, p = .004, d = 0.32\), where \(t\) is the t-statistic from paired samples t-test, \(p\) is the \(p\)-value of the statistic, and \(d\) is the Cohen’s effect size. The perceived stress scores (PSS) have reduced significantly after residential orientation compared to the baseline, \(t(101) = -5.81, p < .001, d = -0.58\), and there was a significant decrease after the follow-up compared to the baseline, \(t(82) = -3.39, p = .001, d = -0.37\). The ERQ-reappraisal scores have improved significantly after residential orientation compared to baseline, \(t(83) = 2.35, p = .021, d = 0.26\), and there was no significant decrease after the follow-up compared to the baseline, \(t(68) = -1.54, p = .128, d = -0.19\).
**Effect of yoga intervention on mindfulness, perceived stress**

### Table 3
Repeated measures results using linear mixed effects model

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Std. error</th>
<th>df</th>
<th>t-value</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td><strong>Baseline (Intercept)</strong></td>
<td>4.47</td>
<td>0.07</td>
<td>185</td>
<td>66.17</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Model 2 (Intercept)</strong></td>
<td>4.27</td>
<td>0.08</td>
<td>183</td>
<td>54.47</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>(MAAS)</strong> MAAS_T2</td>
<td>0.35</td>
<td>0.07</td>
<td>183</td>
<td>4.97</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>MAAS_T3</td>
<td>0.26</td>
<td>0.08</td>
<td>183</td>
<td>3.49</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Comparison of model fit:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline (Intercept)</td>
<td>14.23</td>
<td>0.48</td>
<td>185</td>
<td>29.92</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Model 2 (Intercept)</strong></td>
<td>15.71</td>
<td>0.57</td>
<td>183</td>
<td>27.45</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>(PSS)</strong> PSS_T2</td>
<td>–2.34</td>
<td>0.56</td>
<td>183</td>
<td>–4.20</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>PSS_T3</td>
<td>–2.26</td>
<td>0.60</td>
<td>183</td>
<td>–3.77</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Comparison of model fit:</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Baseline (Intercept)</td>
<td>29.57</td>
<td>0.51</td>
<td>154</td>
<td>57.55</td>
<td>&lt;.001</td>
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<tr>
<td><strong>Model 2 (Intercept)</strong></td>
<td>29.44</td>
<td>0.71</td>
<td>152</td>
<td>41.51</td>
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<tr>
<td><strong>(ERQ-reappraisal)</strong> ERQreappraisal_T2</td>
<td>1.51</td>
<td>0.83</td>
<td>152</td>
<td>1.83</td>
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<td>ERQreappraisal_T3</td>
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<td></td>
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<tr>
<td>Baseline (Intercept)</td>
<td>35.91</td>
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<td>185</td>
<td>74.43</td>
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<td><strong>Model 2 (Intercept)</strong></td>
<td>34.02</td>
<td>0.61</td>
<td>183</td>
<td>56.08</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>(PANAS-positive)</strong> Posaffect_T2</td>
<td>4.28</td>
<td>0.64</td>
<td>183</td>
<td>6.69</td>
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<td>Posaffect_T3</td>
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<tr>
<td>Baseline (Intercept)</td>
<td>16.65</td>
<td>0.44</td>
<td>185</td>
<td>37.44</td>
<td>&lt;.001</td>
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<td><strong>Model 2 (Intercept)</strong></td>
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<td>0.58</td>
<td>183</td>
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<td><strong>(PANAS-negative)</strong> Negaffect_T2</td>
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<tr>
<td>Negaffect_T3</td>
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<td>0.70</td>
<td>183</td>
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<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Comparison of model fit:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: MAAS = mindfulness attention awareness scale, ERQ = emotion regulation questionnaire and PANAS= positive and negative affect scale.

The ERQ-suppression scores have increased after residential program compared to the baseline, but the change was not statistically significant, $t(83) = 0.18$, $p = .86$, $d = 0.02$, and the scores increased after the follow-up compared to the baseline, but again statistically non-significant, $t(68) = 1.00$, $p = .32$, $d = 0.12$. The PANAS positive affect scores have increased significantly after residential orientation compared to the baseline $t(101) = 6.95$, $p < .001$, $d = 0.69$, and there was an increase after the follow-up compared to the baseline which was not statistically significant, $t(82) = 1.42$, $p = .141$, $d = 0.16$. 

![Note: MAAS = mindfulness attention awareness scale, ERQ = emotion regulation questionnaire and PANAS= positive and negative affect scale.](image-url)
The negative affect scores decreased significantly after residential orientation compared to the baseline, $t(101) = -7.00, p < .001, d = -0.69$, and there was a significant decrease after the follow-up compared to the baseline, $b = -0.86, t(82) = -4.92, p = .04, d = -0.54$.

5 Discussion

The main aims of the study were to evaluate effect of yoga-based intervention on mindfulness, perceived stress, positive and negative affect and emotion regulation in working professionals and also to check the stability of the effect after three months of home practice. Most of the variables showed improvement during the 5-day interventional program, however perceived stress, and negative affect showed statistically significant improved even after the follow-up period. ERQ-reappraisal increased significantly and later it decreased during the follow-up period; ERQ-suppression scores however, remained almost similar.

The results show that the 5-day yoga based residential intervention was helpful in managing the stress levels. Better change in various measures after the five days program can be attributed to the intense residential nature of the intervention. However, except mindfulness, and positive affect and emotional suppression strategy, all others domains showed promising improvement even after the self-motivated home practice. This suggests that trait-mindfulness requires more than three months bringing in and sustaining changes and mindfulness helps to promote reappraisal strategy more than suppression. The overall adherence rate was found to be good as in the follow-up data, 33 (32%) reported practicing at least 1–2 times a week and 26 (26%) reported practicing 3–4 times a week.

Mindfulness interventions and its effect on reducing psychological distress is known. Mindfulness is related to effective emotion regulation (Hill and Updegraff, 2012). Emotion regulation refers to the process by which individuals influence which emotions they have, when they have them, and how they experience and express them (Gross, 1998). Cognitive reappraisal and suppression are the two major strategies of emotion regulation. Mindfulness practice appears to develop and strengthen cognitive reappraisal as it enables an individual to create an inner space and respond rather than just react to various situations and events. In our study this aspect has been strengthened considerably especially after the residential intervention. Mindfulness practice is known to be associated with both top down and bottom up emotion regulation strategies (Chiesa et al., 2013). Insights regarding the unique and shared consequences of specific types of emotion regulation are promising area for future research (Gross, 2015).

Mindfulness is known to have an inverse relationship with negative affect and a stronger positive relationship with positive affect (Giluk, 2009). Similar results are also found in our study. Reduced positive affect after the home practice in our case may indicate presence of constant work pressure and an associated tendency of reduced positive thinking. This situation is likely to improve with longer duration of practice as higher mindfulness practice time corresponds to lower levels of negative affect and higher levels of positive affect (Jha et al., 2010). Similar results were also reproduced with respect to perceived stress. Overall, our results reinforce the reported idea that MBIs can be used in organisational settings for the reduction of psychological distress (Virgili, 2015).
As a means of providing a unified body mind experience, yoga has few equals (Salmon et al., 2009). Yoga is one of the six foundations of Indian philosophy and has been used for millennia to study, explain, and experience the complexities of the mind and human existence (Feuerstein, 1998). Yoga is universal, and the postures a reflection of the extraordinary range of the human body’s capacity for movement and balance and stillness (Kabat-Zinn, 2017). Yoga interventions foster psychological wellbeing (Conboy et al., 2010; Gard et al., 2012; Hartfiel et al., 2012). Practice of yoga increase levels of trait mindfulness in healthy population, who had no prior yoga experience (Shelov et al., 2009). Advanced practitioners of yoga are reported to have higher levels of mindfulness and lower levels of stress (Brisbon and Lowery, 2011). Highly involved yoga practitioners had a significant increase in levels of mindfulness and psychological wellbeing (Gaiswinkler and Unterrainer, 2016).

However, MBIs that have been developed for use in work-places or for specific occupational groups differ from those developed for the clinical context in terms of course content and structure [e.g., session length, overall duration (Virgili, 2015)]. Typically, truncated versions of well-validated programs (e.g., MBSR) are deployed in workplace settings. These adaptations are made without drawing on specific knowledge of how and why these programs work (Good et al., 2015). Moreover, duration of mindfulness intervention and the time needed to experience benefits is a common question among potential participants (Creswell, 2017). Most participants have competing time demands, expectation of lengthy out-of-class practice may act as a barrier to participating for some (Carmody and Baer, 2008). Research also needs to examine whether there is a dose response relationship between amount of intervention exposure and amount of psychological benefits (Keng et al., 2011). The practicality of mindfulness training may hinge on the “dose” required for effects. Research on minimum effective doses is promising; yet the sustainability of these effects and their generalisability to the workplace is unknown and their merits need further investigation (Good et al., 2015).

Testing for intervention effects at follow-up time points is an important area that needs research attention. Very few studies have reported on the follow-up daily practice that participants do in the weeks, months, and years post completion of formal mindfulness intervention programs (Creswell, 2017). The current study also tested for the intervention effect after three months of individual practice following the residential intervention. In the current study, following the residential program, participants were expected to continue their daily practice of 35 minutes of cyclic meditation on their own for an additional period of three months. Standardised guided instructions in audio format were provided to facilitate the individual practice. A common trend that a score improves considerably after the residential intervention and later it diminishes a bit during the home practice indicate that a supervised interventional at workplace is necessary in order to harness the best interventional affect.

Mindfulness interventions are multidimensional in nature and involve multiple active components. Future research should examine how individual components of mindfulness intervention contribute to overall treatment effects (Keng et al., 2011). Little work has been done to identify the active ingredients in these programs. Which specific ‘active ingredient’ of the intervention produces what effect is still not known (Chiesa et al., 2013). If different components of mindfulness training have differential effects, then organisations may tailor interventions based on program goals (Carmody and Baer, 2008). Sitting meditation and mindful yoga are found to produce greater differential
effects in psychological wellbeing (Sauer-Zavala et al., 2013). Most often previous studies have usually evaluated mindfulness meditation in the context of a mindfulness-based program such as MBSR. MBSR uses meditation as one element among others (e.g., psycho education). Hence, the observed effects are not singularly attributable to the meditation component (Eberth and Sedlmeier, 2012). Future studies may also focus on how proven interventions can be incorporated into the workplace practice so that wellness becomes an integral part of work life.

5.1 Limitation and future scope

In our current study, we could not have a control group because all the participants were participating in the program as a part of their institutional wellbeing promotion program, and therefore we focused on follow-up study design. In order to evaluate the generalisability of the results, the study can be conducted in different work settings and also with a control group added. Different methods of incorporating this intervention into the daily or weekly activities of the organisation can also be one potential area to focus on in the future.

6 Conclusions

Yoga-based intervention is effective in addressing the stress of senior leadership professionals by improving mindfulness, positive affect, and better emotion regulation strategy. Our study introduces cyclic meditation, as a unique yoga based intervention, and is shown to enhance mindfulness and overall psychological wellbeing. The intervention can easily be implemented and adopted in a workplace context. The time duration for daily practice is only 30 minutes and addresses the minimum ‘dosage’ considerations needed for practical implementation in a workplace. Organisations can implement such tailored interventions producing differential effects in workplace setups where the luxury of a full fledged time consuming interventions is practically limited. Our study also examined the follow-up effect after three months. Management development programs in corporate can include yoga based interventions as a continuous process for fostering employee wellbeing at workplace.

Our study was done on a very large resource based company in India and the same can be replicated in different organisational contexts for generalisability of results. Also, we did not have a control group in the current study and this can be added in future studies. In our current study we observed that due to lack of supervised guidance after the program, there is a high chance of further relapse, which needs further attention to maintain an environment of sustained wellbeing. The underlying pathway mechanisms producing the change could also be a future area of research.

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