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Impact of Mindfulness-based Stress Reduction Intervention on the Performance of Construction Professionals

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IMPACT OF MINDFULNESS-BASED STRESS REDUCTION INTERVENTION ON THE PERFORMANCE OF CONSTRUCTION PROFESSIONALS

ABSTRACT

Purpose: Construction professionals (CPs) are often exposed to various challenges and pressures at work including urgent deadlines, high demands, uncertainty in tasks, and complex problems, which may induce stress and affect performance directly. *Mindfulness-based stress reduction* (MBSR) training has been used for several years to reduce *stress* among various types of people, such as nurses, teachers, and family caregivers, but its application to CPs with highly dynamic environment remains uncertain. This study aimed to investigate the impact of MBSR training on the performance of CPs via an intervention study involving two groups (MBSR and control).

Design/methodology/approach: Participants in both groups were assessed using a questionnaire survey and a semi-structured interview at the pre- and post-intervention stage. Multiple research methods were used to derive quantitative and qualitative analyses, including *factor analysis, independent t-test, Pearson correlation, and contextual analysis.*

Findings: The findings overall confirm that MBSR has a direct effect on CPs, improving their mindfulness characteristics and enhancing performance by reducing their stress.

Originality/value: This research can be considered as valid evidence to convince construction organizations conducting MBSR to the CPs, which is indeed not too remote to enhance their performance as well as the holistic construction performance.

Practical implications: A number of practical recommendations are made such as 1) arranging standard eight-week MBSR training for CPs; 2) giving special leave for attending the full mindfulness training; 3) establishing a suitable environment in the office for meditation; 4) allowing CPs an opportunity to pause at difficult moments to create space to respond instead of simply reacting; and 5) expressing love and kindness through gratitude, recognition, and regular feedback.

Keywords: Construction Professional; Mindfulness; MBSR; Performance; Stress.

INTRODUCTION

The competitiveness of the construction industry drives rapid-paced working environments which put pressure on employees. Construction professionals (CPs) are widely recognized as working in some of the most stressful environments in the world (Ajayi et al., 2019; Leung et al., 2008; Love et al., 2009). Due to the nature of construction projects, including tight time frames, complex problems, poor environment, etc., CPs often suffer from stress in the daily work (CIOB, 2020; Kamardeen and Sunindijo, 2017; Leung et al., 2015). Such excessive and even unmanageable levels of stress may have negative consequences including physical and mental health problems, high compensation costs, and poor performance (Bowen et al., 2013; Leung et al., 2017). Unfortunately, it can be challenging for CPs to manage stress in the construction industry, where organizations always prioritize performance over employee health and are reluctant to attend to mental health. The practical application of relevant stress management techniques by CPs is therefore crucial to ensure good health, wellbeing, and effective performance within organizations.

Stress is related to mental and physical health problems which may impair the performance of a person and an organization (Cohen et al., 2007). In fact, negative consequences of stress have been documented over a long period, such as accidents, turnover, loss of workdays, low

productivity, and so on. Although many studies on stress-related issues have been carried out (Leung et al., 2014, 2015, 2017), there is limited research to date which empirically investigates the impact of stress-reduction programs on the performance of CPs via an intervention study.

Mindfulness-based Stress Reduction (MBSR) was established by Professor Jon Kabat-Zinn at the University of Massachusetts Medical Centre in 1979 (Kabat-Zinn, 1982). A systematic eight-week MBSR training program covers formal and informal mindfulness practices. As a psychological intervention, it has been used to reduce stress; avoid various health issues; as well as improve quality of life in general (Carmody and Baer, 2008; Hyland et al., 2015). The positive effects of mindfulness-based interventions have been examined in different fields (i.e., marketing, military, and healthcare) (Lomas et al., 2019; Khisty, 2010; Zanesco et al., 2019) and various professions such as teaching, family caregiving, therapy, and so on (Doyle et al., 2019; Li et al., 2016; Yip et al., 2017). Although a preliminary study has looked into the simple relationships amongst the items of mindfulness and emotional stress based on very small sample size (Leung and Ahmed, 2019), it is not sufficient to rigorously understand the complex associations amongst the factors of mindfulness, stress and performance. Furthermore, no empirical study has yet been conducted for the effect of MBSR on the stress and performance levels of CPs in the industry. In order to thoroughly investigate stress management for CPs on a practical level, this study examined the impact of a formal eight-week MBSR workshop on the performance of CPs via an intervention study.

Mindfulness Characteristics

Originally, mindfulness was defined as “a means of paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally” (Kabat-Zinn, 1994, p.14). It is, fundamentally, an adaptive metacognitive process which aims to achieve effective self-regulation and stress reduction. The characteristics of mindfulness can be classified into three theoretical groups, namely *attention*, *enlightenment*, and *attitude* (Shapiro et al., 2006; Leung et al., 2016c). *Present focus* and *awareness* refer to **attention** to tasks without disruption (Kabat-Zinn, 1994). Due to the noise, crowds, and other physical obstructions in construction projects, mind-wandering and concentration loss may be common distractions to CPs. Mindfulness involves alerting, orienting, and directing attention to the present experience, which may help individuals to be vigilant, decisive, and able to detect possible threats. Therefore, mindfulness with attention (present focus and awareness) could be effective in mitigating stress and increasing performance.

Enlightenment includes *description*, *observation*, and *curiosity*, which focus on enhancing both internal feelings and external situations (Dekeyser et al., 2008). Firstly, mindful *description* is a process of putting words into categories whatever one notices in both the external environment and one’s own internal emotions, sensations, and thoughts (Baer et al., 2006). Such an approach is expected to build teamwork and communication networks among colleagues as they may be able to understand each other’s minds more clearly. Secondly, *observation* may help CPs to notice changes in their own physical condition, feelings and sensations, and the site environment, which may support their decision making, particularly at critical times, in real situations. Thirdly, *curiosity* reflects a receptivity and openness of mind to new experiences (Kashdan et al., 2009). Curiosity may motivate CPs to explore their working environment for innovation opportunities, trials of new ideas, and uncertainties, so as to get greater insight into their projects and identify possible risks.

On the other hand, *acceptance*, *nonjudgment*, and *nonreactivity* are all categorized into the mindfulness **attitude** group. *Acceptance* refers to acknowledging the experience of one's own sensations and thoughts without *judging* and *reacting* (Bishop et al., 2004). In fact, CPs often encounter numerous challenges arising from various tasks simultaneously, which may create mental pressure and other issues. However, CPs with a mindfulness-oriented attitude may be able to recognize, analyze, and setback from these problems proactively, which empowers them to face job difficulties without reacting instantly. Thus, it is very likely that CPs will be better able to manage the negative impact of stress if they are capable of acceptance, nonjudgment, and nonreactivity when facing various sources of stress.

Stress

Stress is the nonspecific response of the body to any kind of demand made upon an individual (Seyle, 1956). Around 97% of CPs working in the construction industry have reported experiencing considerable stress at work (CIOB, 2020). Due to the complex and demanding nature of construction projects, it is not uncommon for CPs to experience various kinds of stress, including *physical* and *emotional* stress (Bowen et al., 2012; Leung et al., 2014, 2017).

Emotional stress refers to negative emotional states (Maslach et al., 1996), including feelings of being drained, burned out, used up by work, chronically tired, and so on (Gmelch, 1982; Leung et al., 2008a). *Physical stress* refers to the physiological adjustments made by individuals under stressful conditions (Leung et al., 2014; Liang et al., 2021b). A human being usually responds to external stressors by releasing hormones to support the body (Mellner et al., 2005). If the stressor disappears quickly, physiological adjustments will be made to return to normal without affecting the body further. However, if the stressful condition influences an individual continuously for a long time, physical adjustments may manifest themselves in stress symptoms (Nixon et al., 2011). Symptoms of physical stress include muscle tension, raised heart rate, headaches, body pain, high blood pressure, cardiovascular disease, and so on (Leung et al., 2008, 2016b).

Performance

The success of construction projects and the effectiveness of organizations in this sector rely extensively on the performance of CPs. This denotes not only task efficiency but also the relationships between CPs and their colleagues (Campbell et al., 1993). The task performance of CPs is normally associated with productivity (Leung et al., 2014, 2017). In fact, CPs need to be alerted to controlling timescales and ensuring the efficiency of scheduling in order to accomplish projects successfully (Leung et al., 2008). At the same time, interpersonal relationships among coworkers also play an important role in organizations (Van Scotter et al., 2000). Construction projects often involve multiple stakeholders, with the CPs acting as a bridge between them to enable the project to run smoothly. CPs therefore need to develop and continuously maintain good interpersonal relationships with colleagues (Leung et al., 2017). To minimize the adverse effect of stress on CPs, the current study aimed to investigate the impact of a stress management program (i.e., MBSR) on the performance of CPs.

CONCEPTUAL MODEL

Mindfulness-to-meaning theory is adopted for the relations between mindfulness characteristics (attention, enlightenment, and attitude) and stress (emotional and physical stress) (Garland et al., 2017), while the contingency theory is used for relationships between

mindfulness and performance (Dane et al., 2011). Based on the extensive literature review, a conceptual model is proposed to explain the relationships between the three groups of mindfulness characteristics (attention, enlightenment, and attitude), the two types of stress (physical and emotional), and the performance (see Figure 1). Several hypotheses are proposed for the relationships between these factors, including (1) mindfulness characteristics influence CPs physical and emotional stress; (2) mindfulness characteristics improve performance; and (3) suffering from physical and emotional stress impair performance of CPs (see Figure 1).

< **Figure 1** >

RESEARCH METHOD

To investigate the impact of an MBSR workshop on stress management for CPs, an intervention study was carried out. One group of CPs received an eight-week full MBSR training program, while a control group of CPs received no intervention. Rather than restricting to one method, this research adopted a triangulation approach, using both quantitative (survey) and qualitative (interview) methods to obtain appropriate psychometric measurements. A set of questionnaires was administered to both groups before and after the intervention to enable comparison. Semi-structured individual interviews were also conducted before and after the workshops, with the MBSR participants only, in order to collect qualitative data to ensure the reliability of the results via triangulation (Liang et al., 2021a).

Participants

CPs were recruited to participate in the MBSR training workshop. In total, 66 CPs, all from similar backgrounds, were enrolled. Those who participated in the MBSR training were treated as the sample group (n=33), while the group receiving no MBSR training was the control group (n=33). All of the respondents were CPs working in major construction companies such as developers, consultant firms, main contractors, and subcontractors. The majority of the participants were younger, with 45% aged 20-30 years, 22% aged 40-50, 15% in each of the 30-40 and 50-60 age groups, and only 1% aged over 60. The dominance of men in the construction industry was also reflected in this study (65% male and 35% female participants).

Intervention

A standard MBSR training consists of an eight-week program of 2.5 hours per week plus a full-day retreat which takes place between the sixth and seventh sessions (Kabat-Zinn, 1982). To ensure sufficient training, participants were requested to conduct audio-guided home practices for 30-45 minutes every day, including body scanning (attention through different parts of the body from head to toe); sitting meditation (awareness of body sensations, thoughts, and emotions through the breathing); stretching (stretches and postures designed to improve awareness and strengthen the musculoskeletal system); and mindfulness in daily activities (mindful eating, walking, listening, etc.).

Measures

The questionnaire was developed in both English and Chinese and then administered to the respondents by face-to-face contact. The Mindfulness Attention Awareness Scale (MAAS) and Kentucky Inventory of Mindfulness Skills (KIMS) were applied to measure mindfulness

characteristics (e.g., Baer et al., 2006; Feldman et al., 2007; Leung et al., 2016c; Walach et al., 2006), while emotional and physical stress (Greenberg, 2003; Leung et al., 2014), and performance (Cox et al., 1993; Leung et al., 2006, 2008) were measured using a seven-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). All the questionnaires used in our study have been validated.

Quantitative Analysis

To explore the effect of the MBSR workshop on CPs, a sequence of suitable statistical techniques including factor analysis, reliability tests, independent t-tests, and Pearson correlation were conducted to analyze the data. Factor analysis was used to reduce the number of items by grouping closely related items into factors. Subsequently, reliability analysis was performed by computing Cronbach's alpha, to ensure the internal consistency of these factors. In order to quantify the impact of the MBSR workshop on CPs, independent t-tests were conducted to establish the differences in factors between the participant and control groups. Additionally, Pearson's correlation was applied to examine the relationships among the factors of mindfulness, stress, and performance in both the participant and control groups.

Contextual Analysis

To strengthen the findings of the quantitative analysis, contextual analysis was also used to assist the researchers in developing and validating findings on this specific topic (Berg, 2001). Multiple approaches were adopted, including i) audiotapes, ii) worksheets from individual participants, and iii) contemporaneous notetaking during the individual interviews. All the participants' responses, in context, were thoroughly inspected by the researchers. The data were then collated and merged based on the themes, and further categorized into different groups according to the literature. Finally, keywords and phrases were summarized and identified from the interview discourses (see Table III).

RESULTS

Factor Analysis and Reliability Test

A principal component analysis (PCA) with Varimax rotation was used to reduce the measurement items into factors. Due to the limited sample size (66), only those items with factor loading values greater than 0.6 were accepted (Tabachnick and Fidell, 2007). The Kaiser-Meyer-Olkin (KMO) values for all the factors were greater than 0.60. All three groups of mindfulness characteristics (attention, enlightenment, and attitude) satisfied the sample to item ratio. The items for mindfulness, stress, and performance were subjected to factor analysis separately, and generally loaded onto the predicted factors, including present focus (M1), awareness (M2), description (M3), observation (F4), curiosity (M5), acceptance (M6), nonjudgment (M7), and nonreactivity (M8); physical stress (PS) and emotional stress (ES); and performance (P) (see Table 1). All the alpha values in the present study were higher than 0.6, and thus considered reliable (Pallant, 2020) (see Table I).

< **Table I** >

Independent t-test

An independent t-test was adopted to determine the differences in mindfulness characteristics, stress, and performance between the MBSR and control groups (see Table II).

< Table II >

No significant difference between the groups was found in the pre-MBSR workshop. However, five out of the eight mindfulness characteristics, including *present focus*, *curiosity*, *observation*, *acceptance*, and *nonreactivity* group were significantly greater for the MBSR than the counter-characteristics of the control group post-MBSR, with differences of 1.071, 1.606, 1.051, 0.848, and 0.990, respectively ($p < 0.01$). The *emotional stress* of the MBSR group was less than the control group, with a difference of -0.727 ($p < 0.05$), while the mean *performance* of MBSR participants was significantly higher than the control group, with a difference of 0.985 ($p < 0.01$).

Pearson Correlation Analysis

Pearson correlation analysis was used to determine the strength and direction of the relationships among mindfulness characteristics, stress, and performance (see Table III). The results showed that 1) *physical stress* was significantly negatively related to *present focus* (M1), *description* (M3), *observation* (F4), *curiosity* (M5), and *acceptance* (M6); 2) *emotional stress* correlated negatively to *present focus* (M1), *awareness* (M2), *description* (M3), *observation* (M4), *curiosity* (M5), and *acceptance* (M6); 3) *performance* was significantly positively related to *present focus* (M1), *awareness* (M2), *description* (M3), *observation* (M4), *acceptance* (M6), and *nonreactivity* (M8); and 4) both *physical* and *emotional stress* have negative relationships with *performance*.

< Table III >

Contextual Analysis

To ensure the generalizability and transferability of the findings, the qualitative data were reviewed in depth. Scripts relating to the mindfulness characteristics, stress, and performance information collected from participants at pre- and post-test are summarized in Table IV. The qualitative results show that most of the mindfulness characteristics including present focus, observation, curiosity, acceptance, and nonreactivity had increased significantly after the MBSR training. For instance, participant B stated that “*I lose concentration and cannot work well*”, and “*I cannot anticipate how I am feeling*” (pre-MBSR), whereas they commented “*I can focus on my work and mistakes are reduced*”, and “*I can observe my feelings, emotions, and sensations objectively*” (post-MBSR).

< Table IV >

The outcomes of the individual interview analyses are illustrated in Table V, which shows the original scripts related to the interactions between mindfulness characteristics, stress, and performance of participants pre- and post-workshops. Before the training, these CPs were under high levels of stress and did not use mindfulness to manage their stress. For instance, participant G expressed that “*with the practice of mindful observation, the frequency of having a headache and exhaustion is less than before*” and “*I am more aware of my negative feelings and behaviors than before, and I am not nervous about situations*” (G). Additionally, the

participants reported that the MBSR training had cultivated mindfulness characteristics, which led to a reduction in stress and subsequently an improvement in their performance (see Table V).

< Table V >

DISCUSSION

Final Model

A Mindfulness-Stress-Performance model was developed based on the results of the quantitative and qualitative data (see Figure 2). It shows that the MBSR workshop had a positive impact on CPs as follows: 1) certain mindfulness characteristics (i.e., *present focus*, *observation*, *curiosity*, and *acceptance*) have negative relationships with emotional stress; 2) certain mindfulness characteristics (i.e., *present focus*, *observation*, *acceptance*, and *nonreactivity*) have positive associations with performance; and 3) emotional stress has a negative influence on performance.

< Figure 2 >

Mindfulness Characteristics and Stress

MBSR has been shown to be effective in helping CPs to manage their stress. CPs with *present focus* (M1) can sustain their attention and utilize their emotional efforts properly. This active presence of mind enables CPs to remain vigilant to various types of hazards and alarming situations, and thus prevents them from exerting unnecessary effort in their tasks. The improvement of present focus was expressed by a participant (D) in the following statement: “*after doing sitting meditation on the bus, I was more focused on my breathing and feel much relaxed*” (see Table V). Being in the present gives a sense of strength and acknowledgment through the connection with real situations and enables CPs to feel resilience, support, and care. Mindfulness present focus is thus helping CPs to reorient their perceptions of stressful situations at the present moment (Wu et al., 2019). Therefore, CPs anchored to the present moment are saving themselves from exposure to further harmful activities and, consequently, reducing their *emotional* stress.

The findings demonstrate that the enlightenment mindfulness characteristics (*curiosity* and *observation*) also minimize the *emotional stress* of CPs. The job of CPs is normally a demanding one, involving multiple tasks which can cause exhaustion, but enlightenment through curiosity can enable them to overcome these physical feelings with an appreciation of novelty, challenge, and uncertainty. CPs with *curious mind* will be open to unique experiences and can explore interesting aspects of everyday tasks (Kashdan et al., 2009), which can enhance willingness and confidence to see stressful experiences as a challenge instead of a threat. For instance, participant D said that “I am *interested in new and old things*, and willing to learn more about them” after joining the MBSR.

Mindfulness observation (M4) characteristics can also reduce emotional stress. Deep observation enables CPs to notice the feelings of their own bodies as well as the surrounding environment. CPs can observe their physical feelings with fewer negative thoughts.

Furthermore, they can separate themselves from a difficult situation and let their inner knowledge come to the front of their minds. In fact, when they pause, they can create a space to respond to stressful conditions. One of the participants (A) expressed the view that “*I had some basic knowledge of things, and I am too subjective*” (pre-MBSR), followed by “*now, I observe things in different dimensions to manage my stress*” (post-MBSR).

Out of the three attitude characteristics, only *mindful acceptance* (M6) reduced the *emotional stress* of CPs in the study. Participant A stated that “*it was difficult to accept many things*” (pre-MBSR), while “*I am learning to accept negative emotion with open mindset this year*” (post-MBSR). In fact, jobs in construction are hectic, time-consuming, complex and exhausting, leading to various health issues. When CPs acknowledge the reality of their situation, they can adjust their job activities according to their capabilities. This can improve their wellbeing and reduce emotional stress. *Acceptance* helps CPs to change their perceptions of stress from negative to positive. It empowers them to face challenges at work, enabling them to observe their responses toward stress and respond creatively rather than negatively.

Mindfulness Characteristics, Stress, and Performance

Performance of CPs was enhanced by *present focus* (M1). Normally, an individual’s mind wanders as they carry out job tasks, which creates difficulties in concentrating on tasks and interpersonal interactions. This lack of present focus often reduces efficiency, decreases active listening, and leads to mistakes. Through the MBSR workshop, CPs were able to increase their ability to focus on the present moment and reduce distractedness. For instance, one participant (H) reported that “*I am easily distracted by others*” (pre-MBSR), and “*now, I can pay attention to what is happening, and my performance is better as well*” (post-MBSR).

The deep *observations* (M4) of CPs of their internal health as well as the external working environment can play a significant role in performance. CPs have not only learned to be aware of their feelings, sensations, emotions, and job situations via MBSR training, but have been trained to observe them objectively. Furthermore, they become vigilant to sensing external stimuli by hearing sounds, observing views, and proactively identifying problems with the project. This enlightenment can assist them to understand the realities of the project, thus preventing health hazards and leading to better performance. Participant C mentioned that “*I started to observe, while I was not worried about my performance*” (post-MBSR).

Furthermore, this study also shows that the attitude of *acceptance* (M6) was increased by the MBSR training and resulted in a significant improvement in the performance of CPs. It enables CPs to regard their difficult jobs (i.e., long working hours, project crises, demanding tasks, and so on) more positively. MBSR intervention had cultivated new paradigms among CPs to accept their personal as well as their professional lives. This was well expressed by one participant (J) through the following statements: “*whenever I argued with others, my work performance was affected*” (pre-MBSR) followed by “*my work performance has been improved, when I start accepting the task positively*” (post-MBSR). CPs with this attitude can be less reluctant to accept any tasks that prevents confrontation with others and, thus, improve their performance.

Likewise, after the MBSR training, *nonreactivity* (M8) characteristics improved the *performance* of CPs. In practice, it is not uncommon for CPs to face various challenges including tight schedules, poor environments, complex technical problems, etc. A reactive attitude in such circumstances can easily exacerbate stress and impair performance (Leung et al., 2016c). Having an attitude of nonreactivity directs the internal and external responses of

CPs without engagement with the negative emotions and subsequently improves their *performance*. Hence, CPs can step back from distressing thoughts without getting overwhelmed by them. As participant E put it, “*I can let go things easily*” (post-MBSR). Similarly, another participant (F) stated that “*I cannot let go of my negative thinking*” (pre-MBSR) but then “*when something happens, I can let it go and tackle the problem in better ways*” (post-MBSR).

In sum, the study is considered as valid evidence of the success of an MBSR intervention in the construction industry, and it helps to develop a stress management intervention training in the construction industry. The Mindfulness–Stress–Performance model (see Figure 2) has been established particularly for CPs based on both quantitative and qualitative studies. Overall, the research contributes to a novel approach of stress management for CPs in the construction industry. Hence, the results of this research make important contribution in the knowledge of stress management for construction professionals.

RECOMMENDATIONS

Practical Implications

The present study has confirmed the impact of a MBSR training workshop on stress reduction and performance improvement for CPs. Based on these findings, the specific recommendations are summarized in Table VI.

< Table VI >

The t-test results have shown that the MBSR training had a significant positive impact on participants compared with nonparticipants. Therefore, it is strongly recommended that construction companies and/or professional institutions in the industry arrange ***standard eight-week MBSR training for CPs*** to enable them to learn the key characteristics of mindfulness progressively (e.g., openness, perception, attentional focus, mindful listening), to share their feelings and opinions together and to adopt various mindfulness practices in daily life. It would be ideal for construction companies also to *give special leave or support* to their employees who are receiving the mindfulness full training or may wish to do in future. Additionally, it is suggested that employers *create a comfortable environment in the office for meditation* during periods of high-pressure work.

Through the MBSR training intervention, CPs also identified key mindfulness characteristics including present focus, observation, acceptance, and nonreactivity, which have a significant effect in reducing emotional stress and improving performance. To cultivate a focus on the *present moment*, the easiest way is to practice ***sitting meditation*** during meal breaks. This could be either a short (three minutes) pause or a formal (15-30 minutes) session to anchor their attention through breathing. As a result, CPs will be more focused on targets and more attentive in their communication with peers, which can improve both their task and interpersonal performance (Johari and Jha, 2021).

Furthermore, a sense of enlightenment (observation) about oneself and the environment can be adopted to reduce negative feelings and improve performance. Therefore, it is recommended that CPs *practice various mindful exercises, such as sitting, walking, and body scan*, to help understand their own state of health more carefully and prepare space for any possibilities. In

fact, dynamic construction projects often involve simultaneous activities that require mindful observation. To attend to these multiple events in a complicated working environment, *CPs should be encouraged to record and share their observations of all pleasant and unpleasant events at work*, including both those arising from the external environment and their intrinsic feelings and sensations.

Finally, mindfulness attitude (acceptance and nonreactivity) is also significant in reducing stress and improving performance for CPs. When CPs learn to accept the reality of their job conditions, they can overcome negative thoughts and redirect them in more useful ways. Thus, CPs should practice *sitting meditation with sound/thought and mindful stretching*, particularly on site when experiencing unpleasant working conditions, in order to enhance the quality of acceptance. Moreover, it will be advantageous for organizations to develop a supportive environment which demonstrates acceptance for CPs even though the workplace is challenging. Therefore, management teams would be well advised to *express their kindness through gratitude, recognition, and feedback* to CPs in their daily work. In addition, it would be useful for CPs to be *allowed to take a pause at difficult moments* to create space to respond instead of simply reacting.

Limitation and Future Research

This study is part of an initial effort to assess the feasibility of MBSR workshop training in the construction industry. There are some limitations which should be noted. The relatively small sample size limits the generalizability of the findings to the entire construction industry. Firstly, the CPs in both the MBSR and control groups completed and submitted the survey before and after the eight-week standard MBSR workshop. Secondly, a wide literature review was conducted to identify all the items and scales adopted for measurement (Baer et al., 2006; Cox et al., 1993; Feldman et al., 2007; Greenberg, 2003). Thirdly, all the factors grouped in the statistical analysis showed good psychometric properties, with Cronbach's alpha values greater than 0.6 for all factors (including mindfulness characteristics, stress, and performance).

Due to the time commitment involved in the formal eight-week MBSR training course, most CPs will be reluctant to join such training either on the job or after hours. It is recommended that the duration of the MBSR sessions is reduced, and they are scheduled at the most convenient times for the employees to attract the maximum number of participants. In order to encourage CPs to join mindfulness events, further research should be conducted to investigate the impact of *short mindfulness sessions and courses* on CPs. Furthermore, majority of the participants were Chinese and cultural factors may influence the findings. Therefore, future studies are suggested to investigate the impact of culture on the MBSR training. In addition, the MBSR training examined in this study took place in person, whereas most training has now shifted online due to the pandemic. Future studies are therefore needed to test the impact of online MBSR training in the construction industry.

The current study followed the participants only for an eight-week MBSR workshop. The lack of follow-up data limits the ongoing benefit of this research. An investigation of the *long-term impact of the MBSR* was outside the scope of this study, so no conclusion can be drawn about the duration of the effects identified or any possible barriers to continuing mindfulness practice among CPs. Further work is required to confirm whether these improvements are sustained for a longer period after completion of the MBSR training. To address this, longitudinal studies investigating the long-term effects of MBSR on CPs should be conducted.

CONCLUSION

The present study, which used both quantitative and qualitative research methods, has found that five mindfulness characteristics and performance are enhanced via the MBSR workshop, while emotional stress reduced only in the MBSR group. It confirms the positive impact of MBSR training on CPs, with the findings demonstrating that improvements in mindfulness characteristics, including present focus, observations, curiosity, and acceptance can reduce emotional stress. The performance of CPs is increased by present focus, observation, acceptance, and nonreactivity, and hampered by emotional stress. These findings will not only help to improve stress management strategies for CPs but useful to improve performance both at individual and organizational levels. In order to practice mindfulness effectively in the construction industry, several practical recommendations have been proposed, such as arranging a standard eight-week MBSR training program for CPs, offering special leave employees to enable them to participate; creating an environment for meditation; expressing love and kindness via gratitude, recognition, and regular feedback, etc. Finally, it is suggested that future research look at the long-term impact of MBSR training in the construction industry using longitudinal studies.

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