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Effectiveness of Mindfulness in Reducing Stress and Anxiety during Technological Change: A Randomized Controlled Trial

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This study investigates the effectiveness of mindfulness-based interventions in reducing stress and anxiety among technology professionals during the implementation of significant technological changes within their organization. It is designed as a randomized controlled trial (RCT) with four assessment points (baseline, post-intervention, and follow-ups at 3 and 6 months), where 64 participants, including software developers, systems engineers, and data analysts, were randomized to either a mindfulness-based intervention group (n = 32) or a waitlist control group (n = 32). Stress levels were measured using the Perceived Stress Scale (PSS), and anxiety levels were assessed with the Beck Anxiety Inventory (BAI). Significant reductions in stress and anxiety were observed post-intervention, and these improvements were maintained during the follow-up assessments, confirming the effectiveness and sustained benefits of mindfulness-based interventions in managing stress and anxiety associated with technological change.

Keywords: mindfulness, work-related stress, anxiety, technological change, psychological intervention.

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Introduction

The technology sector is known for its demanding work environment, where professionals face long hours, tight deadlines, and constant pressure to adapt to rapidly evolving technologies. These challenges generate high levels of stress and anxiety, negatively affecting employees' mental health and productivity (Lazarus & Folkman, 1984; Maslach et al., 2001). During periods of technological change, such as the adoption of artificial intelligence and automation, the pressure increases, adding to the cognitive and emotional load, and potentially compromising performance (Prasad et al., 2023; Wang et al., 2021).

These demands not only lead to a decline in mental health but also cause burnout, reduced performance, and higher staff turnover (Cuervo et al., 2018; González-Fernández et al., 2024). Without adequate support and training during these transitions, stress and inefficiency grow, creating instability in the workplace (Schwabe & Castellacci, 2020). In this context, technostress becomes a significant issue. Technostress is defined as the psychological stress experienced due to difficulties in adapting to new technologies and the intensive, sometimes overwhelming, use of digital tools. It is characterized by emotional exhaustion, frustration with frequent technical issues, and anxiety over the rapid obsolescence of skills, as employees struggle to keep up with the continuous updates and demands of technology in the workplace (Kaltenegger et al., 2023; Tarafdar et al., 2007).

Recent studies confirm that increasing technological demands, such as the intensified remote work during the pandemic and the rapid adoption of digital tools, have significantly exacerbated stress levels in sectors like technology and education (Molino et al., 2020; Rey-Merchán et al., 2021). This increase is partly attributed to information overload, lack of digital disconnection, and the need for continuous skill acquisition to remain competitive in the labor market (Wu et al., 2024). Remote work, in particular, has led to social isolation, emotional disconnection, and increased psychosocial risks related to technostress, as highlighted by recent investigations into its impact on mental health and the balance between work and personal life (Cuervo et al., 2018; Rey-Merchán et al., 2021). Additionally, adapting to emerging technologies, such as artificial intelligence, presents significant challenges, intensifying stress and anxiety among workers who must learn to operate new tools while maintaining high performance standards (Cuervo et al., 2018; Wu et al., 2024).

The COVID-19 pandemic amplified these challenges, as the shift to remote work brought additional stressors, such as maintaining team cohesion and balancing work and personal life (Wang et al., 2021). Research by Molino et al. (2020) found that the rapid transition to digital work during the pandemic increased stress, particularly for employees with less digital experience, heightening their anxiety and feelings of incompetence. Increased screen time and the blurred boundaries between work and home life contributed to burnout and reduced overall well-being. Frequent interruptions and multitasking further hinder concentration on critical tasks, especially during periods of technological change (Karr-Wisniewski & Lu, 2010).

To address these challenges, mindfulness-based interventions have emerged as an effective strategy for reducing stress and anxiety in tech environments (Bartlett et al., 2021; Hülsheger et al., 2013; Vonderlin et al., 2020). Mindfulness offers not only practical benefits but also psychological mechanisms that support stress reduction, as explained by the Broaden-and-Build Theory of positive emotions, proposed by Fredrickson (2001). Positive emotional states expand individuals' thought-action repertoires, facilitating the development of lasting personal resources like resilience, adaptability, and emotional regulation (Fredrickson, 2001; Garland et al., 2015). Mindfulness, by cultivating non-judgmental awareness and encouraging positive emotions, supports this process (Aikens et al., 2014). Through mindfulness practice, individuals enhance internal resources, enabling them to manage daily stress and adapt to the challenges of fast-paced technological environments more effectively (Bartlett et al., 2019; Bostock et al., 2019).

Mindfulness offers a stabilizing approach that helps employees manage cognitive overload and anxiety resulting from intensive technology use (Kabat-Zinn, 2015; Vonderlin et al., 2020). Studies have shown that mindfulness programs not only reduce work-related stress but also improve overall employee well-being, creativity, and problem-solving capabilities (Bostock et al., 2019; Schwind et al., 2020). Furthermore, mindfulness has been found to strengthen resilience and adaptability, helping professionals cope with the constant innovation and change typical of the technology sector (Lomas et al., 2019).

Weinberg and Cooper (2017) emphasize that mindfulness is a valuable tool for managing stress during technological change, as it helps employees adapt more effectively and reduces stress. A meta-analysis by Khoury et al. (2015), covering 29 studies, confirmed the effectiveness of mindfulness in reducing stress, anxiety and burnout in work environments, underscoring its value in promoting workplace well-being.

The present study

This study evaluates the effectiveness of an eight-week mindfulness intervention in reducing stress and anxiety among technology professionals during the adoption of a new cloud-based project management platform. Stress and anxiety are key outcome variables due to their prevalence in high-demand work environments like the technology sector. Perceived stress refers to the cognitive appraisal of external pressures as overwhelming (Cohen et al., 1983), while anxiety is an emotional response characterized by worry and tension (Beck et al., 1988).

Building on evidence that mindfulness interventions help reduce stress and anxiety by alleviating mental overload and enhancing emotional regulation (Hülsheger et al., 2013; Khoury et al., 2015), this study further explores these outcomes within a structured intervention and follow-up framework. By addressing both stress and anxiety, mindfulness practices offer a holistic approach to fostering emotional well-being in high-pressure environments (Cohen et al., 1983; Vonderlin et al., 2020).

In light of this evidence, the study is guided by the following hypotheses:

H1: Participants in the mindfulness intervention group will experience a significant reduction in stress levels compared to the waitlist control group after the intervention.

H2: Participants in the intervention group will also show a significant decrease in anxiety levels compared to the control group post-intervention.

H3: These benefits are expected to be sustained over time, with the following specific outcomes:

- H3a: Participants in the intervention group will maintain reduced stress levels at the 3-month follow-up.
- H3b: Participants in the intervention group will maintain reduced stress levels at the 6-month follow-up.
- H3c: Participants in the intervention group will maintain reduced anxiety levels at the 3-month follow-up.
- H3d: Participants in the intervention group will maintain reduced anxiety levels at the 6-month follow-up.

Method

Design

This study was a RCT with four assessment points: baseline, post-intervention, and follow-ups at 3 and 6 months. Participants were randomly assigned to an experimental group or a waitlist control group to enable comparison.

Participants

The study included 64 technology professionals, evenly divided between an experimental group (n = 32) and a control group (n = 32). The average age was 31.75 years in the experimental group and 32.10 years in the control group. Gender composition was 56.3% men in the experimental group and 62.5% men in the control group. Most participants held a university degree (56.3% in the experimental group, 59.4% in the control group), and 40.6% in both groups had over 10 years of experience (see Table 1 for detailed demographics).

There were no dropouts during the study, and all 64 participants completed the intervention and follow-up assessments.

Participants were selected based on voluntary interest, meeting criteria like full-time employment, at least 2 years of sector experience and no severe psychological disorders. Exclusion criteria included voluntary withdrawal, incomplete program participation or incomplete responses at all measurement points.

Sample Size

The sample size was determined using G*Power, targeting a significance level of 0.05 and a power of 0.80. A total of 56 participants (28 per group) was estimated for a medium effect size (d = 0.50), but 64 participants were

included (32 in each group) to ensure robust statistical power and enhance internal validity, following previous research on mindfulness interventions (Bartlett et al., 2019; Schwind et al., 2020).

Table 1. *Sociodemographic Data of Participants*

		Experimental Group		Control Group	
		M/N	**SD/%**	**M/N**	**SD/%**
Gender	Male	18	56.30	20	62.50
	Female	14	43.70	12	37.50
Age		31.75	5.55	32.10	5.60
Education Level	Secondary or equivalent	0	0.00	0	0.00
	Vocational training	14	43.70	13	40.60
	University degree	18	56.30	19	59.40
Professional Role	Software Developer	12	37.50	11	34.40
	Systems Engineer	10	31.30	11	34.40
	Data Analyst	10	31.30	10	31.30
Years of Experience	Less than 5 years	4	12.50	5	15.62
	Between 5 and 10	15	46.90	14	43.80
	More than 10	13	40.60	13	40.60

Instruments

Perceived stress was measured using the 10-item Perceived Stress Scale (PSS), developed by Cohen et al. (1983) and adapted into Spanish by Remor (2006). The PSS, rated on a 5-point Likert scale, assesses the unpredictability and uncontrollability of situations, with ítems (e.g. In the last month, how often have you felt that you were unable to control the important things in your life?). In this study, the PSS demonstrated good internal consistency, with a Cronbach's alpha of 0.85.

Anxiety was assessed using the Beck Anxiety Inventory (BAI), developed by Beck et al. (1988) and adapted into Spanish by Sanz and Navarro (2003). This 21-item self-report questionnaire uses a 4-point scale ranging from 0 (not at all) to 3 (severely, I could barely stand it), and includes items such as numbness or tingling. In this study, the BAI demonstrated high internal consistency, with a Cronbach's alpha of 0.90.

In addition to the PSS and BAI, an ad hoc sociodemographic questionnaire was administered, specifically designed to collect relevant participant data. This questionnaire included questions about age, gender, educational level, years of experience in the technology sector, and the specific role performed in the company.

Procedure

In July 2023, a mindfulness program aimed at reducing stress and anxiety was proposed to the management of a technology company in Zaragoza. Designed to support employees during the adoption of a new cloud-based project management platform, the program was structured over an 8-week period to allow sufficient time for participants to learn, practice, and integrate mindfulness skills effectively. The eight-week duration aligns with research suggesting it is optimal for achieving significant reductions in stress and anxiety, as it provides participants the necessary time to internalize mindfulness skills and apply them in daily life (Bartlett et al., 2019; Vonderlin et al., 2020).

This timeframe is consistent with evidence from workplace mindfulness interventions that demonstrate

improvements in well-being and emotional regulation over similar periods (Schwind et al., 2020). Additionally, the eight-week structure follows the design of established mindfulness-based programs, such as the widely recognized Mindfulness-Based Stress Reduction (MBSR) program developed by Kabat-Zinn (2015), which has been shown to effectively reduce stress and promote mental clarity.

The proposal was approved, and the program was scheduled to begin in September 2023.The program was designed to support employees during the adoption of a new cloud-based project management platform, a transition requiring adaptation to new workflows and software tools. The proposal was approved, and the program was scheduled to begin in September 2023.

Between September 1 and 15, informational sessions were held to explain the study and the potential benefits of participating in the program. Employees were invited to voluntarily enroll in the study. Participants were then randomly assigned to either the experimental group or the waitlist control group using a random number generator. Informed consent was obtained from all participants prior to the start of the program.

The experimental group commenced the 8-week mindfulness intervention in September 2023, consisting of weekly one-hour sessions led by a trained psychologist. The waitlist control group did not engage in any alternative activities or interventions during this period and was instructed to maintain their usual routines. This approach was chosen to ensure that any observed effects in the experimental group could be attributed solely to the mindfulness intervention, without potential confounding variables introduced by alternative activities. Upon completion of the 6-month follow-up assessment for the experimental group, the control group was offered the same 8-week mindfulness program.

Initial measurements were taken from September 16 to 20, 2023, using a sociodemographic questionnaire, the PSS, and the BAI to establish baseline levels of stress and anxiety. Post-intervention measurements were collected from November 21 to 25, 2023, to compare stress and anxiety levels between the experimental and control groups. Follow-up assessments were conducted at 3 and 6 months (February and May 2024).

Session Structure

Each weekly mindfulness session lasted one hour, beginning with an introduction and review of the previous week's practices, allowing participants to share their experiences and challenges. Key mindfulness concepts like attention, non-judgmental acceptance, and stress management were introduced to help participants integrate mindfulness into daily life. The psychologist guided various meditation practices, including body scanning and movement meditation, along with conscious breathing exercises to promote emotional regulation and stress reduction. Sessions concluded with a summary and homework assignments, such as daily meditation. Participants also received printed guides and recordings of guided meditations to support their practice at home.

The structure of the mindfulness sessions, along with the timeline for assessments at baseline, post-intervention, and follow-ups, is summarized in Table 2.

Data analysis

The data were analyzed using IBM SPSS Statistics 26.0 to assess the effectiveness of the mindfulness intervention. Descriptive analyses were performed to examine mean scores and standard deviations for stress and anxiety, along with summary statistics like frequencies and percentages.

The main analysis used repeated measures ANOVA with two factors: time (pretest, posttest, and follow-ups at 3 and 6 months) and group (experimental vs. control). Mauchly's test checked sphericity, and post hoc tests with Bonferroni correction identified significant differences at specific time points. A one-factor repeated measures ANOVA was conducted to track changes within each group over time. Effect sizes were calculated using Cohen's d to measure the magnitude of differences between groups.

Table 2. *Structure and Timeline of the Mindfulness Intervention*

Timeline	Session Details and Measurement Points
Pretest	Baseline assessment
Week 1	Introduction to mindfulness and mindful breathing practice
Week 2	Non-judgmental observation and body scan
Week 3	Present-moment awareness and focused meditation
Week 4	Emotional regulation and deep breathing practice
Week 5	Stress reduction strategies and movement meditation
Week 6	Mindfulness in difficult situations: visualization and stress management
Week 7	Integrating mindfulness into daily life with mindful attention meditation
Week 8	Review and compassion practice
Posttest	Assessment after the intervention (Week 8)
Follow-Ups	Evaluations at 3 and 6 months

Results

As shown in Table 3, the repeated measures ANOVA revealed that the mindfulness intervention led to a significant reduction in stress and anxiety levels in the experimental group compared to the control group.

In line with Hypothesis 1, the experimental group's stress levels, measured by the PSS, decreased significantly after the intervention (from M = 24.5 to M = 19.2). These reductions were maintained at the 3-month (M = 18.9) and 6-month (M = 19.1) follow-ups, supporting Hypotheses 3a and 3b. In contrast, the control group showed minimal changes over time. Post hoc tests confirmed significant differences between pretest and all post-intervention assessments, with an effect size of 0.75, indicating substantial stress reduction.

Supporting Hypothesis 2, the experimental group's anxiety levels, measured by the BAI, dropped significantly post-intervention (from M = 21.0 to M = 15.5). These improvements were sustained at the 3-month (M = 15.5) and 6-month follow-ups, confirming Hypotheses 3c and 3d. In contrast, the control group experienced minimal changes. Post hoc tests revealed significant reductions in anxiety levels between pretest and each of the follow-up assessments, with an effect size of 0.78, demonstrating a substantial reduction in anxiety. Overall, the mindfulness intervention produced significant and sustained reductions in stress and anxiety, with moderate to large effect sizes across all dimensions and time points.

Table 3. *Descriptive Statistics and Repeated Measures ANOVA for Study Variables*

	Experimental Group		Control Group		Time	Group	Interaction	Cohen's d
	M	SD	M	SD	F(3,186)	F(1,62)	F(3,186)	
Beck Anxiety Inventory (BAI)								
Pretest (T1)	24.52	6.20	25.17	6.59	24.56***	8.35**	15.23***	0.78
Posttest (T2)	19.26	5.85	24.79	6.26				
3-Month Follow-up (T3)	18.96	5.64	24.95	6.41				
6-Month Follow-up (T4)	19.17	5.72	24.66	6.31				
Perceived Stress Scale (PSS)								
Pretest (T1)	12.86	3.54	13.16	3.65	22.34***	7.45**	14.78***	0.75
Posttest (T2)	9.78	3.21	12.97	3.59				
3-Month Follow-up (T3)	9.20	3.19	12.80	3.60				
6-Month Follow-up (T4)	9.31	3.32	12.94	3.52				

Note. * p<.05 ; ** p<.01; *** p < .001.

Discussion

This study demonstrates the effectiveness of an eight-week mindfulness intervention in reducing perceived stress and anxiety among technology professionals. These findings are particularly significant in high-pressure environments, where cognitive overload, rapid innovation, and organizational change are prevalent stressors.

Our results align with existing research highlighting the efficacy of mindfulness interventions in high-demand occupational settings. For example, Vonderlin et al. (2020) demonstrated that mindfulness programs significantly reduce psychological distress across diverse work environments, a finding reflected in the substantial reductions in stress observed in our participants. Similarly, Bartlett et al. (2021) emphasized the role of mindfulness in enhancing emotional regulation, which may explain the notable anxiety reductions in our study.

Mindfulness interventions are especially valuable in roles requiring cognitive flexibility and stress management. For instance, Lomas et al. (2019) highlighted their benefits in cognitively demanding fields like healthcare and education, where parallels can be drawn to the challenges faced by technology professionals. This is further supported by Aikens et al. (2014) and Wolever et al. (2012), who reported significant reductions in stress among employees in global IT firms, findings that closely mirror the stress and anxiety improvements observed in our study.

In addition to the immediate benefits observed, the sustained reductions in stress and anxiety at the 3- and 6-month follow-ups in this study underscore the potential long-term impact of mindfulness practices. These findings align with prior research demonstrating the enduring effects of mindfulness interventions. For instance, Toniolo-Barrios and ten Brummelhuis (2023) highlighted the role of mindfulness in supporting employees during periods of organizational change, while Rueda (2022) reported long-lasting improvements in psychological well-being among individuals in high-pressure work environments. Similarly, a meta-analysis by Lomas et al. (2019) confirmed that

mindfulness-based interventions effectively reduce stress and anxiety among healthcare professionals, with benefits persisting well beyond program completion. Collectively, these studies reinforce the potential of mindfulness to sustain improvements in emotional well-being over time, as evidenced by the results of our follow-up assessments.

Theoretical Implications

This study provides insights into how mindfulness interventions can address both stress and anxiety, contributing to a broader understanding of their psychological impact. Emotional regulation appears to play a significant role, as mindfulness helps reduce emotional reactivity to workplace demands and disrupts maladaptive rumination patterns (Hölzel et al., 2011). Emerging evidence supports these processes, suggesting that mindfulness fosters more adaptive responses to stress by enhancing prefrontal-amygdala connectivity and reducing physiological markers, such as cortisol (Britton et al., 2021; Creswell et al., 2019). While this study did not directly measure these markers, the sustained improvements in stress and anxiety align with these proposed mechanisms. Furthermore, findings from Lomas et al. (2019) highlight the effectiveness of mindfulness in improving emotional regulation across various professional settings. The significant reductions in perceived stress and anxiety observed in our participants are consistent with these results, suggesting that mindfulness practices may offer valuable support in managing the demands of high-pressure work environments.

The findings also reinforce established theoretical frameworks that explain how mindfulness alleviates stress and anxiety. For example, the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984) emphasizes the importance of cognitive appraisals in shaping stress responses. By fostering present-moment awareness, mindfulness facilitates the reappraisal of workplace demands, enabling individuals to perceive challenges as manageable rather than overwhelming (Brown & Ryan, 2003; Garland et al., 2015). Consistent with this, a meta-analysis by Vonderlin et al. (2020) demonstrated that mindfulness programs enhance coping strategies by mitigating maladaptive cognitive patterns, such as catastrophizing, findings mirrored in the improved stress and anxiety levels observed in our study.

Complementing this perspective, the Conservation of Resources (COR) Theory (Hobfoll, 1989) provides a resource-based explanation for mindfulness's benefits. In resource-depleting environments like the technology sector, mindfulness serves as a buffer, replenishing emotional and cognitive resources and preventing exhaustion. This aligns with findings by Li et al. (2023) and Zhang et al. (2021), which underscore mindfulness's role in reducing burnout and promoting resource conservation in high-pressure workplaces. The sustained improvements in stress and anxiety levels among our participants reflect these mechanisms, highlighting the potential of mindfulness interventions to foster long-term well-being.

Psychological flexibility further emerges as a potential mechanism linking mindfulness to reduced stress and anxiety. Defined as the ability to adapt to changing demands and balance competing psychological needs, flexibility is critical for navigating uncertainty and organizational change (Kashdan & Rottenberg, 2010). Recent frameworks, such as those proposed by Ciarrochi et al. (2024), emphasize flexibility as a core outcome of mindfulness practices, enabling individuals to maintain emotional balance and effective coping strategies. Supporting this, Goldberg et al. (2022) identified psychological flexibility as a key outcome of mindfulness-based interventions, providing a foundation for sustained improvements in stress and anxiety, as seen in our study.

Finally, the Broaden-and-Build Theory (Fredrickson, 2001) provides a conceptual framework for understanding how mindfulness fosters positive emotional states that enhance coping capacity. By broadening cognitive and behavioral repertoires, mindfulness may help individuals develop personal resources, such as adaptability and problem-solving skills, which are especially valuable in high-pressure work environments. While this study focused on stress and anxiety, related findings by Aikens et al. (2014) and Jamieson et al. (2022) suggest that these benefits may also contribute to improved collaboration and innovation, particularly in technology-driven workplaces.

Practical Implications

The findings of this study demonstrate the practical value of mindfulness-based interventions at both individual and organizational levels. For employees, mindfulness provides tools to regulate emotional responses and manage stress effectively, addressing challenges like burnout, absenteeism, and cognitive overload (Bartlett et al., 2019; Hülsheger et al., 2013). By enhancing attentional control, mindfulness improves focus and task prioritization, enabling better decision-making and reducing errors in roles that demand sustained concentration and adaptability (Creswell et al., 2019; Tang et al., 2015). Furthermore, mindfulness disrupts maladaptive patterns such as rumination and catastrophizing, promoting a constructive mindset that supports adaptive problem-solving (Aikens et al., 2014; Garland et al., 2015).

At an organizational level, mindfulness programs yield measurable benefits, including increased productivity, improved employee retention, and reduced absenteeism (Aikens et al., 2014; Wolever et al., 2012). By mitigating the effects of stress, these programs enhance workforce engagement and reduce turnover, thereby lowering associated costs and disruptions to team dynamics. Mindfulness also fosters creativity and cognitive flexibility, both critical for team-based decision-making and innovation in fast-paced, technology-driven industries (Lomas et al., 2019; Zhang et al., 2021). By cultivating resilience and adaptability, mindfulness helps organizations navigate periods of change and uncertainty more effectively (Bartlett et al., 2021; Jamieson et al., 2022).

Mindfulness interventions address several practical challenges facing modern workplaces. For instance, stress management in high-pressure environments is critical for maintaining employee well-being and productivity. Tailored interventions, such as shorter mindfulness sessions for professionals with limited time or app-based solutions for remote workers, can improve accessibility and engagement (Bostock et al., 2019; Creswell et al., 2019). These flexible approaches are particularly relevant in hybrid work settings, where employees face unique stressors, including blurred boundaries between work and personal life. Organizations can enhance the effectiveness of these programs by aligning them with specific workforce needs, ensuring both accessibility and long-term engagement.

Incorporating mindfulness into organizational wellness initiatives also fosters a workplace culture conducive to collaboration and innovation. Cognitive flexibility and emotional regulation, developed through mindfulness, enable employees to approach challenges with clarity and

composure, enhancing problem-solving and team dynamics (Garland et al., 2015; Vonderlin et al., 2020). These qualities are invaluable in industries where rapid adaptation and effective decision-making are prerequisites for success (Lomas et al., 2019; Zhang et al., 2021).

To ensure successful implementation, organizations must address barriers such as skepticism about resource allocation and program sustainability. Demonstrating the return on investment (ROI) of mindfulness interventions through measurable outcomes, such as improved employee retention, lower healthcare costs, and enhanced productivity, can help build managerial support (Aikens et al., 2014; Bartlett et al., 2021). Pilot programs tailored to specific workplace contexts can further align interventions with organizational goals, maximizing their impact and ensuring sustainability (Goldberg et al., 2022; Wu et al., 2024).

Finally, sustaining engagement over time is essential to amplify the long-term impact of mindfulness programs. Digital resources, such as app-based exercises, peer support networks, and periodic workshops, offer scalable solutions to help employees maintain their mindfulness practice. These strategies enable organizations to create a supportive environment where mindfulness becomes an integral part of workplace culture, fostering enduring benefits for both individuals and the organization as a whole (Bostock et al., 2019; Creswell et al., 2019).

Strengths and Limitations

This study sheds light on the potential of mindfulness interventions to address stress and anxiety in high-pressure workplace environments. While the findings are encouraging, assessing the strengths that underpin their validity and recognizing the limitations provides a clearer understanding of the study's implications and paves the way for future research opportunities. One of the key strengths of this study is its use of a randomized controlled trial (RCT) design, which ensures robust internal validity by minimizing selection bias and enabling stronger causal inferences regarding the effects of the intervention (Khoury et al., 2015). The inclusion of follow-ups at 3 and 6 months provides compelling evidence for the sustainability of mindfulness' effects, addressing a critical gap in the literature on workplace interventions. Additionally, the complete retention rate observed highlights the feasibility and acceptability of the intervention, even in demanding work environments like the technology sector. This high level of engagement underscores the relevance of the program and suggests its practical applicability in real-world settings.

However, as with any study, some limitations should be considered. The relatively small and homogeneous sample, drawn from a single technology company, may limit the generalizability of the findings to other industries or cultural contexts. For example, the unique challenges faced by professionals in the technology sector, such as cognitive overload and rapid organizational changes, could influence the effectiveness of the intervention. Future research with larger and more diverse samples could help confirm these findings across different organizational settings and cultural environments, broadening the applicability of mindfulness interventions.

Another consideration is the reliance on self-report measures, which, while widely used and validated, are subject to potential biases such as social desirability or individual differences in interpretation (Creswell et al., 2019). These biases may have influenced the reported reductions in stress and anxiety. Incorporating complementary methods, such as physiological indicators like cortisol levels or heart rate variability, could strengthen the evidence base by providing an objective perspective on the intervention's effects. The integration of qualitative measures, such as in-depth interviews or focus groups, could also add depth by capturing participants' lived experiences of the intervention. In conclusion, while this study underscores the potential of mindfulness interventions in workplace settings, addressing its limitations in future research will help refine their applicability and effectiveness across diverse contexts.

Conclusion

This study offers strong evidence that mindfulness-based interventions can be effective in reducing stress and anxiety among professionals in the technology sector during periods of technological change. The results indicate that the benefits of these interventions are not only immediate but also sustained over time, with significant effects observed up to six months after the intervention. These results underscore the potential of mindfulness as a helpful tool for enhancing emotional well-being and adaptability in demanding work environments.

Data Availability

The datasets generated during and analyzed during the current study are available from the corresponding author on reasonable request.

Ethics declarations

This study was conducted in accordance with the ethical principles established in the Declaration of Helsinki and the applicable regulations for psychological interventions, respecting confidentiality standards and participants' privacy rights as stipulated by the Spanish Organic Law 3/2018 on the Protection of Personal Data and Guarantee of Digital Rights (LOPDGDD) and the General Data Protection Regulation (GDPR) of the European Union.

Conflict of Interest

The author states that there is no conflict of interest.

Informed Consent

All participants included in this study provided informed consent prior to the collection and analysis of their data, ensuring that they fully understood the purposes and methods of the research.

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