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## Mindfulness-Based Physiotherapeutic Intervention for Administrative Staff in Upper Secondary Education: Effects on Work-Related Stress and Interoceptive Awareness.

### Case Series

**Salma Alejandra Jiménez Juárez**

*The author declares no institutional affiliation*

✉ Corresponding Author: Salma Alejandra Jiménez Juárez, Tel: +52 5618240982. sajj.ft@gmail.com

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# Mindfulness-Based Physiotherapeutic Intervention for Administrative Staff in Upper Secondary Education: Effects on Work-Related Stress and Interoceptive Awareness.

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**Abstract:** Physical therapists can play a key role in addressing public health issues such as work-related stress, which has had considerable negative consequences for workers' health in Mexico. **Objective:** To describe the effects of a mindfulness-based intervention on work-related stress and interoceptive awareness among administrative staff in upper secondary education (n = 12). **Case Description:** Twelve administrative employees from an educational center were included. Prior to the intervention, participants reported stress levels ranging from "no stress" to "moderate stress," as measured by the Work Stress Test of the Mexican Social Security Institute (IMSS). Similarly, each participant presented varying levels of interoceptive awareness, measured using the Multidimensional Assessment of Interoceptive Awareness (MAIA). **Intervention:** The intervention consisted of twelve sessions incorporating passive and dynamic mindfulness techniques, conducted at the workplace during working hours. **Results:** A reduction in work-related stress levels was observed in 11 of the 12 participants, as well as an increase in interoceptive awareness in 11 participants. **Conclusion:** Mindfulness-based physiotherapeutic interventions may serve as valuable therapeutic resources for positively impacting work-related stress and body awareness among educational staff.

### Summary Box

*Mindfulness-based physiotherapy may represent a valuable strategy for promoting both physical and mental health among public-sector workers. Physiotherapists can play a key role in the prevention and management of social and public health issues, such as occupational stress, whose consequences in Mexico have become increasingly severe and evident.*

**Keywords:** Mindfulness, work-related stress, physiotherapy, interoception awareness, mental health

## Introduction

The issue of Work-related stress and its emerging solutions is of interest to all health professionals. In this context, the physiotherapists holds a critical position to support the implementation and dissemination of strategies that promote well-being and mental health in diverse population groups, particularly among workers. To achieve this, they can rely on the biopsychosocial model and implement therapeutic resources such as mindfulness—a mind-body intervention that constitutes one of the two fundamental pillars of mental health physiotherapy: body awareness and physical activity.<sup>1</sup>

Persistently high levels of stress contribute to the development of mental disorders, particularly depression, anxiety, and burnout syndrome. In terms of physical health, stress can lead to cardiovascular diseases, musculoskeletal disorders, and gastrointestinal conditions, among others. Moreover, it may trigger maladaptive coping behaviors such as excessive consumption of alcohol, tobacco, and drugs, as well as the emergence of risky habits and unfavorable lifestyle changes that act as risk factors for the onset of non-communicable diseases.<sup>2-4</sup>

Today, work-related stress is considered a modern-life epidemic.<sup>4-5</sup> According to a recent report from the World Health Organization (WHO), Mexico ranks first globally in the prevalence of work-related stress, with a rate of 75%, surpassing countries like China and the United States.<sup>6</sup> This means that approximately 8 out of every 10 people in Mexico experience work-related stress.<sup>7</sup> This phenomenon not only poses a public health issue but also represents an economic and social problem, resulting in productivity losses equivalent to up to 4% of the national GDP, decreased work performance, absenteeism, and even workplace accidents. Consequently, the financial impact extends to individuals, businesses, institutions, and the healthcare system.<sup>8</sup>

The concept of mindfulness refers to a stable mental state in which distractions do not hijack attention. This state or attitude is cultivated by focusing on the present moment experience, while becoming fully aware of the thoughts, emotions, and bodily sensations that arise, and accepting them just as they are, without judgment or labeling.<sup>9-12</sup> Mindfulness practices can be divided into two main categories: mindfulness-informed interventions and mindfulness-based interventions. The former are influenced by mindfulness philosophy and combined with other methodologies to produce specific physiological or psychological effects, such as stress reduction, improved respiratory function, or enhanced interoceptive awareness (the

mostly unconscious internal perception of bodily states) through breathing exercises or sequences of mindful movement. In contrast, mindfulness-based interventions aim to cultivate it as the primary goal, often involving formal mental exercises like mindful breathing. A key example is the Mindfulness-Based Stress Reduction (MBSR) program developed by Jon Kabat-Zinn in 1979 at the University of Massachusetts, originally designed for managing chronic pain patients.<sup>10-14</sup>

This case series aims to describe the effects of a mindfulness-focused intervention on levels of work-related stress and interoceptive awareness in administrative staff from upper secondary education institutions, who reported distress due to excessive workload and presented with varying degrees of stress and interoceptive awareness, as evaluated using two different measurement instruments.

### **Case Presentation**

This study included 12 individuals performing administrative roles at an upper secondary education center. As an initial step, an informational session was conducted for both managerial and administrative staff to present the issue of work-related stress and its harmful health effects, as well as explaining the objectives of the research. This activity aimed to encourage voluntary participation in the project and, in parallel, while promote self-care as a transversal component within physiotherapy practice.

Table 1 presents the general characteristics of the participants who chose to be part of this case series, including personal details, clinical background, main stress-related concerns, and whether they had previously received any intervention to address this issue. All participants worked nine-hour days, five days a week, with a 45-minute break each day.

### **Diagnostic Evaluation**

Each participant's level of work-related stress was assessed using the Work Stress Test from the Mexican Social Security Institute (IMSS)<sup>2</sup> (Appendix 1). This tool consists of 12 items rated on a scale from 1 to 6, ranging from 'never' to 'very frequently,' based on the symptoms experienced during the last three months. Total scores extend from 12 to 72; higher scores indicate greater severity of work-related stress. The initial evaluation followed the instrument's original guidelines, focusing on the past three months. However, the post-intervention assessment applied the same test, referencing the previous month to measure the immediate effect of the intervention.

**Table 1.** Participant characteristics

Participant	Gender	Age	Position	Physical Condition	Mental Condition	Reported Stress	Associated Complaints	Previous Intervention
P1	Female	32	Counselor	None	None	Not reported	None	None
P2	Male	29	Administrative Assistant	None	None	Pressure to meet deadlines	None	None
P3	Female	49	Counselor	Hypertension	None	Excessive workload	Anxiety and elevated blood pressure	None
P4	Male	59	Administrative Assistant	Type 2 Diabetes and Hypertension	Depression	High-pressure work	Insomnia	None
P5	Female	33	Counselor	None	None	Not reported	Anxiety and overweight	None
P6	Female	20	Lab Manager	None	None	Headaches, eye and stomach pain	Gastrointestinal issues	None
P7	Female	43	Outreach Coordinator	Hypothyroidism	None	Sleep problems, difficulty enjoying rest days	Poor stress management	None
P8	Male	46	Maintenance Officer	Type 2 Diabetes	None	Increased workload	Anger and frustration	None
P9	Female	39	Administrative Deputy Director	None	None	Not reported	Stress	None
P10	Female	52	Assistant to the Director	None	None	Not reported	Stress	None
P11	Female	47	Librarian	Hypertension	None	Managing several tasks simultaneously	Hypertension	None
P12	Male	61	Maintenance Officer	Hypertension	None	Not reported	None	None

To measure interoceptive awareness, the Multidimensional Assessment of Interoceptive Awareness (MAIA)<sup>45</sup> was used (Appendix 2). The scale comprises 32 items across eight subscales: "Noticing, Not-Distracting (three reverse-scored items), Not-Worrying (two reverse-scored items), Attention Regulation, Emotional Awareness, Self-Regulation, Body Listening, and Body Trusting." The maximum score is 40, with reversed items adjusted before calculating the final score. Higher scores reflect greater interoceptive awareness. Both this scale and the Work Stress Test were self-administered via digital forms (Google Forms) at the beginning and end of the intervention.

### **Therapeutic Intervention**

The intervention involved twelve group sessions in total, each lasting 90 minutes. These were held at the workplace during working hours, with two sessions conducted per week.

The sessions incorporated mindfulness-based strategies applied within a physiotherapeutic context. Six sessions focused on static corporal practices, such as body scanning and mindful breathing. The other six sessions involved dynamic practices, such as mindful stretching and walking, as described in Table 2. Minimal materials were required: yoga mats and comfortable clothing to facilitate participation.

At the end of each session, participants were reminded of the date and materials needed for the next session, along with the health benefits of mindfulness practices, in order to foster adherence to the program.

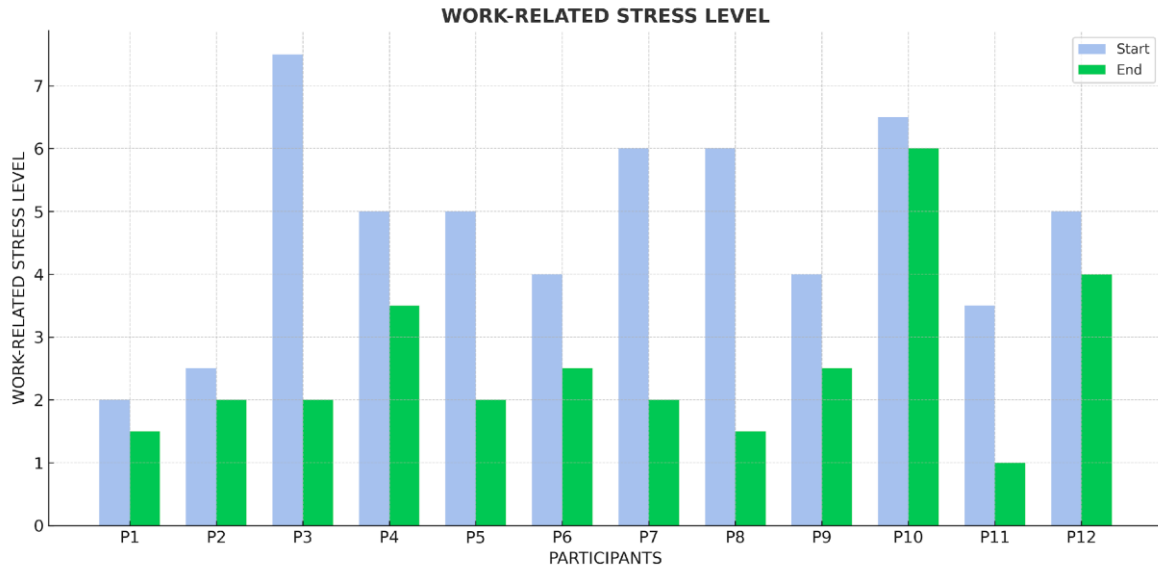
### **Results**

A comparison of initial and final evaluations revealed that 11 out of the 12 participants experienced a reduction in their levels of work-related stress. In contrast, participant P6 showed a slight increase in their score, rising from 33 to 34 on the IMSS Work Stress Test (Figure 1). This increase was linked to more frequent experiences of symptoms during the past month, including extreme fatigue, localized pain, decreased sexual interest, and muscle tremors.

Regarding interoceptive awareness, scores improved in 11 of the 12 participants following the intervention. Participant P3 was the only exception, showing a decrease in his total score from 26 to 24.1, as shown in Figure 2. This decline was reflected primarily in the MAIA subscales: Noticing, Attention Regulation, Emotional Awareness, Body Listening, and Body Trusting, detailed in Table 3.

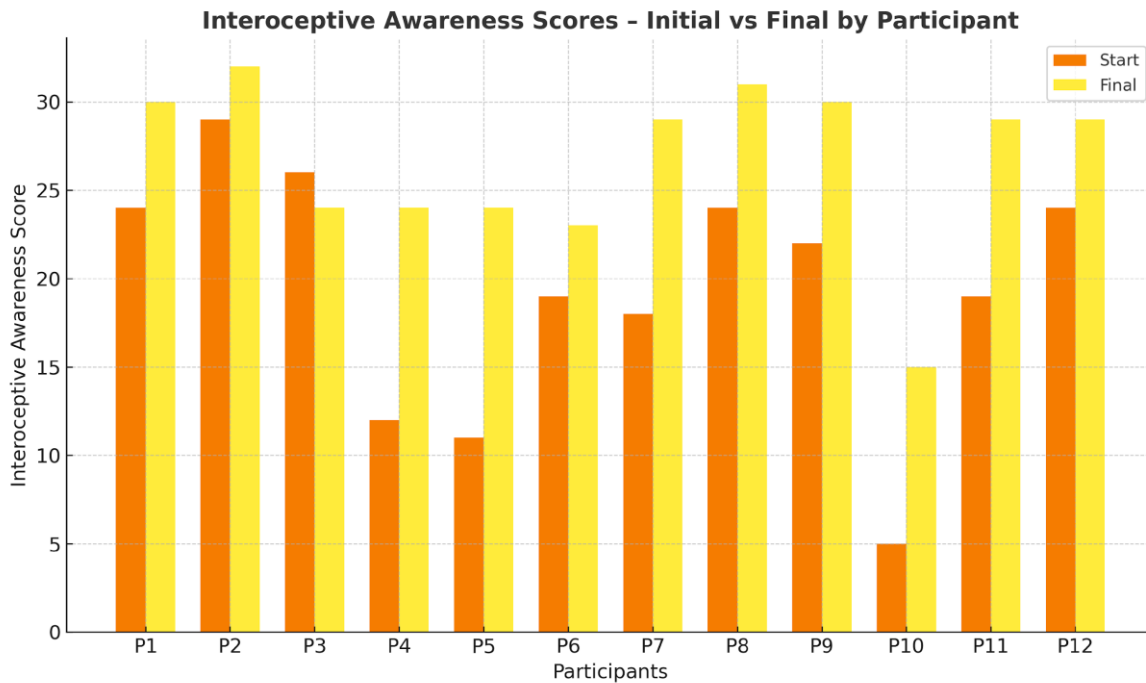
**Table 2.** Description and structure of the therapeutic intervention

THERAPEUTIC INTERVENTION			
<b>Body-Based Practices</b>	Mindful Movement (Stretching and Walking)	Stillness-Based Practices (Body Scanning and Mindful Breathing)	Two sessions per week
<b>Number of Sessions</b>	6	6	
<b>Frequency</b>	Once per week	Once per week	
Therapeutic Session Development			
Session Stage	Description		Duration
<b>Introduction</b>	Attendance was taken and a warm welcome provided to create a sense of safety and trust. General instructions were given, encouraging curiosity, self-compassion, and a non-judgmental attitude during the activity.		10 minutes
	<p>The core component of these sessions is to prioritize <b>awareness in movement</b> rather than movement quality, through guiding questions such as:</p> <p><i>“What sensations do you notice in your body as you perform this movement?”</i></p> <p><i>“Does this movement evoke any emotions?”</i></p> <p><i>“As you hold this position or perform this movement, do you perceive any sensations in distal areas of your body?”</i></p>	Participants were encouraged to maintain the same position throughout the exercise, allowing themselves to fully engage with the present-moment experience. Only in cases of pain or discomfort were they invited to shift into a more comfortable position.	
Development	<p>The session included a routine of dynamic stretches involving the spine as well as the upper and lower limbs, performed in various positions: supine, seated, and standing. These exercises were accompanied by calming background music to promote a sense of relaxation and body awareness.</p> <p>At the end of the routine, participants engaged in a group walk in a circle, during which they were invited to focus their attention on bodily sensations and emerging emotions during movement. This practice was encouraged to be performed barefoot in order to enhance sensory perception and bodily awareness.</p>	<p>A body scan exercise was conducted in a supine position, lying on mats placed on the floor. The practice began at the feet and progressed toward the head, guiding participants to focus their attention on present sensations in different parts of the body, as well as on the perceived size and shape of those sensations, with particular emphasis on the joints. The activity was accompanied by relaxing background music to facilitate a state of calm and inner connection.</p> <p>At the end of the scan, participants performed 20 conscious breaths in the same position, marking the closure of the intervention.</p>	70 minutes
Session Closure	<p>At the end of the session, participants were invited to voluntarily share their individual experiences, expressing thoughts, sensations, and perceptions related to the intervention. This space aimed to foster an environment of empathy, active listening, and validation of personal experiences.</p> <p>To conclude, the benefits of mindfulness—introduced at the beginning of the program—were revisited, thereby reinforcing participants’ motivation and the sense of continuity in the therapeutic process.</p>		10 minutes



**Figure 1.** Work-Related Stress levels by participant

*Note.* The values for work-related stress levels correspond to those used in the IMSS Work-Related Stress Test.



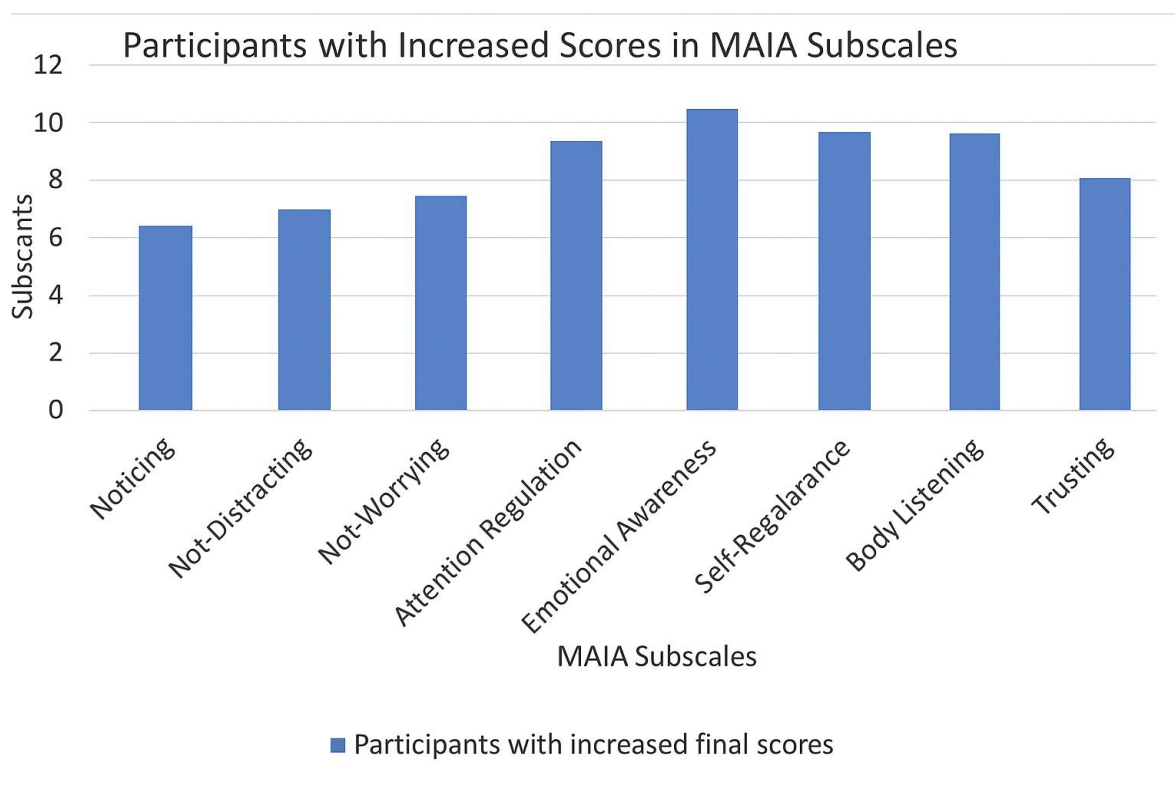
**Figure 2.** Interceptive Awareness scores by participant

**Table 3.** Results of each subscale of the Multidimensional Assessment of Interoceptive Awareness by participant

Participant	Noticing		Not-Distracting		Not-Worrying		Attention Regulation		Emotional Awareness		Self-Regulation		Body Listening		Trusting	
	Start	Final	Start	Final	Start	Final	Start	Final	Start	Final	Start	Final	Start	Final	Start	Final
<b>P1</b>	4.0	3.7	2.6	3.0	1.0	1.0	2.5	3.8	3.8	5.0	3.7	5.0	2.6	3.3	4.0	5.0
<b>P2</b>	4.0	3.5	1.3	3.0	3.3	3.6	3.1	3.5	5.0	4.6	4.2	4.7	4.0	4.3	5.0	5.0
<b>P3</b>	4.5	4.2	3.0	4.0	1.0	1.6	3.0	1.7	3.8	3.6	3.7	3.7	3.0	2.0	4.0	3.3
<b>P4</b>	1.7	4.0	0.6	1.0	0.0	2.0	1.4	3.1	4.2	4.6	2.5	3.6	0.6	3.0	0.6	3.3
<b>P5</b>	3.2	3.2	1.6	2.3	0.0	2.6	0.8	3.0	2.4	3.0	0.2	3.2	1.0	3.6	1.6	3.0
<b>P6</b>	2.0	2.2	2.3	2.3	3.0	3.3	1.5	2.0	2.0	3.6	2.2	3.0	2.0	2.6	3.0	3.3
<b>P7</b>	4.0	3.2	2.3	1.6	1.6	3.0	1.1	3.8	3.8	4.6	1.0	4.0	1.3	4.0	2.6	5.0
<b>P8</b>	2.5	4.5	2.6	1.0	2.3	2.3	3.2	4.4	3.6	4.8	3.2	4.7	3.3	4.6	3.3	4.6
<b>P9</b>	3.7	4.2	0.0	1.6	1.0	3.0	2.5	4.1	4.0	4.8	4.7	4.5	2.3	3.3	3.6	5.0
<b>P10</b>	2.2	2.0	0.6	1.3	0.6	2.0	0.0	1.1	1.2	3.8	0.5	2.0	0.0	0.6	0.0	2.0
<b>P11</b>	3.7	3.7	1.6	0.0	1.6	3.6	2.1	4.2	4.0	4.0	2.5	4.7	0.0	4.0	3.3	5.0
<b>P12</b>	4.0	4.2	0.6	1.3	2.0	2.0	2.4	3.1	4.8	4.8	3.5	4.5	2.6	4.3	4.3	4.3

**Note.** Shaded cells indicate the subscales in which participants' final scores, compared to their initial scores, reflect an increase in interoceptive awareness levels.

Overall, the five MAIA subscales that showed improvement in the largest number of participants were: Attention Regulation and Body Listening (both in 11 of 12 cases); Self-Regulation (10 participants); and Not-Worrying and Body Trusting (9 participants), as summarized in Table 4 and Figure 3.



**Figure 3.** MAIA Subscales with the highest number of participants showing increased Interoceptive Body Awareness after the intervention.

## Discussion

The final results demonstrated that mindfulness, when applied within the physiotherapeutic context, had a favorable effect on reducing work-related stress, as 11 out of 12 participants showed a decrease in their stress levels. These findings are consistent with previous research that strongly supports mindfulness as an effective strategy for alleviating occupational stress.<sup>10</sup> Similarly, another study reported that the implementation of mindfulness, particularly through the Mindfulness-Based Stress Reduction (MBSR) program, successfully reduced work-related stress levels among psychiatric nursing staff, a population characterized by a high workload and significant emotional demands.<sup>16</sup>

The therapeutic intervention implemented in this study, carried out at the participants' workplace and during working hours, may have contributed to their physical and mental well-being. This assertion is supported by a systematic review indicating that mindfulness training programs conducted in workplace

settings promote workers' mental health and well-being by reducing occupational stress levels. Moreover, such interventions have been reported to positively impact mental disorders such as depression, as well as to improve job satisfaction and work performance.<sup>17</sup> It is worth noting that only participant P6 exhibited an outcome contrary to the expected, which may be related to specific physical experiences identified during the final assessment of work-related stress. In this case, an increase was observed in the frequency of symptoms such as extreme fatigue and exhaustion, reduced sexual interest, muscle tremors, and painful or stabbing sensations in various parts of the body. This outcome may be attributable to individual factors or the participant's specific occupational context.

This intervention did not specifically assess the impact of psychosocial risk factors, which are closely related to the conditions and organization of the work environment. These factors may have been present during the intervention period and could have influenced the outcomes obtained.

Regarding the results on interoceptive awareness, an increase was observed in 11 out of 12 participants, suggesting a positive effect of mindfulness when applied as a physiotherapeutic tool. This improvement may represent a relevant benefit in the participants' work context, as the five MAIA subscales that showed the greatest improvements were: *Attention Regulation*, *Noticing*, *Self-Regulation*, *Not-Worrying*, and *Trusting*. Among these, *Noticing* and *Trusting* have been associated with greater resilience and improved stress coping. Notably, the *Trusting* subscale, which evaluates the individual's relationship with their own body, may support the development of healthier interpersonal relationships and, consequently, contribute to better job performance.<sup>14</sup>

The results obtained are consistent with previous studies reporting the positive effects of mind-body therapies, such as mindfulness and body awareness practices, which have been shown to enhance interoceptive awareness among other benefits.<sup>18</sup>

It is important to note that participant P3 experienced an outcome contrary to the rest of the group, showing a decrease in interoceptive awareness levels after the intervention, which may be attributed to individual factors. Interoception can be assessed through objective measures—known as interoceptive accuracy—which reflect the ability to perceive internal physiological signals. This may differ from interoceptive sensitivity, which is based on self-reported perception and individual beliefs regarding bodily sensations. Therefore, the self-perception of interoception may not always align with an individual's actual physiological

interoceptive state. Additionally, self-report scales such as the MAIA assess specific skills that require a certain level of conceptual understanding and body-oriented language. This presents a methodological challenge, as participants' interpretation of the items may vary and even shift before and after undergoing a mind-body intervention.<sup>18</sup>

One limitation of this case series lies in the adjustments made to the original instructions of the IMSS Occupational Stress Test, which was designed to assess symptom frequency over the past three months. In this study, the original timeframe was preserved for the initial assessment; however, for the final evaluation, the reference period was adapted to the last month to measure the immediate effect of the intervention. This methodological decision aligns with the specific objective of the study and the intervention duration (six weeks), seeking a more direct correlation between the intervention and the observed changes.

Another relevant limitation was the lack of in-depth contextual information about the participants. No data were collected regarding their social situation or specific psychological aspects. Although they were asked about the presence of mental disorders, as shown in Table 1, this information was insufficient for a more in-depth analysis. Future research should consider collecting more detailed information on participants' physical health status in order to identify potential comorbidities or dysfunctions that could influence the intervention's outcomes. Likewise, it is important to take into account biopsychosocial risk factors and their potential impact on occupational stress levels, as well as to explore whether these can be positively modified through this or similar interventions.

In this regard, mindfulness, when integrated as a resource within physiotherapy, represents a therapeutic tool with the potential to promote physical and mental well-being among employees in public education institutions.

### **Informed Consent and Ethical Considerations**

Once participants voluntarily expressed their intention to take part in the study, they were provided with an informed consent form (Appendix 3) prior to the initial diagnostic assessment and the therapeutic intervention. Following the General Health Law on Health Research, specifically Article 17, this study is considered to involve minimal risk, as it employed diagnostic tools to assess physiological and behavioral states and included low-intensity physical exercises focused on body awareness.

**Equity, Diversity, and Inclusion Statement**

Participants in this study were selected through an open call addressed to all administrative staff at the workplace, ensuring voluntary participation. All individuals who expressed interest were accepted and included without distinction of age, gender, religion, socioeconomic status, ethnic background, or sexual orientation. Throughout the intervention, all participants received the same level of care, guidance, information, and instructions, ensuring equitable treatment in every session.

**Patient Perspective**

At the end of the intervention and following the final evaluation, participants were invited to share their personal experience through a questionnaire. All respondents reported having had a positive experience. Most participants highlighted a greater connection with their bodies, as well as the acquisition of strategies to listen to and better understand their physical sensations. Commonly reported perceptions included feelings of relaxation and well-being. Additionally, several participants indicated that they had acquired useful tools for regulating emotions, coping with stress, and improving their overall quality of life.

**Conflict of Interest**

The authors declare no conflicts of interest in relation to this study.

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**APPENDICES****Supplementary Material**

Supplemental material associated with this article will be made available [here](#).

- Appendix 1 - Work-Related Stress Test
- Appendix 2 - Multidimensional Assessment of Interoceptive Body Awareness
- Appendix 3 - Informed Consent