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Original article

Adherence of healthcare professionals to a mindfulness program

Aderência de profissionais de saúde a um programa de mindfulness

Adhesión de los profesionales sanitarios a un programa de mindfulness

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Abstract

Objectives: to examine adherence to an eight-week online mindfulness program among healthcare professionals. **Method:** the study included 44 participants who completed a mindfulness workshop, a questionnaire, and the Mindful Attention Awareness Scale (MAAS) and Perceived Stress Scale (PSS-14). **Results:** a significant difference was found in the MAAS item "I tend not to notice feelings of physical tension..." ($p < 0.038$) among non-adherent participants. For the PSS-14, adherent participants showed improvement in the item "How often have you thought about tasks you need to complete?" ($p < 0.023$). **Conclusion:** the intervention positively influenced attention and awareness in adherent participants. Non-adherence may have limited benefits, with one significant change observed. These findings highlight the importance of session attendance and suggest the influence of external variables, such as workload and the number of sessions. Future studies should further explore how these factors affect engagement and outcomes to enhance program effectiveness in real-world settings.
Descriptors: Attention; Mindfulness; Mental Health; Awareness; Thinking

Resumo

Objetivos: examinar a adesão a um programa online de *mindfulness* de oito semanas entre profissionais de saúde. **Método:** o estudo incluiu 44 participantes que completaram um workshop de mindfulness, um questionário e a Escala de Consciência da Atenção Plena (MAAS) e a Escala de Estresse Percebido (PSS-14). **Resultados:** foi encontrada uma diferença significativa no item MAAS "Eu tendo a não perceber sentimentos de tensão física..." ($p < 0,038$) entre os participantes não aderentes. Para o PSS-14, os participantes aderentes mostraram melhora no item "Com que frequência você pensa nas tarefas que precisa realizar?" ($p < 0,023$). **Conclusão:** a intervenção influenciou positivamente a atenção e a consciência nos participantes aderentes. A não adesão pode ter benefícios limitados, com uma mudança significativa observada. Esses achados destacam a importância da frequência às sessões e sugerem a influência de variáveis externas, como carga de trabalho e número de sessões. Estudos futuros devem explorar mais a

fundo como esses fatores afetam o envolvimento e os resultados para aumentar a eficácia do programa em contextos reais.
Descritores: Atenção; Atenção Plena; Saúde Mental; Conscientização; Pensamento

Resumen

Objetivos: examinar la adherencia a un programa online de mindfulness de ocho semanas entre profesionales de la salud. **Método**: el estudio incluyó a 44 participantes que completaron un taller de mindfulness, un cuestionario y la Escala de Conciencia de la Atención Plena (MAAS) y la Escala de Estrés Percibido (PSS-14). **Resultados**: se encontró una diferencia significativa en el ítem MAAS «Tiendo a no percibir sensaciones de tensión física...» ($p < 0,038$) entre los participantes no adherentes. En cuanto al PSS-14, los participantes adherentes mostraron una mejora en el ítem «¿Con qué frecuencia piensa en las tareas que tiene que realizar?» ($p < 0,023$). **Conclusión**: la intervención influyó positivamente en la atención y la conciencia de los participantes adherentes. La no adherencia puede tener beneficios limitados, con un cambio significativo observado. Estos hallazgos destacan la importancia de la asistencia a las sesiones y sugieren la influencia de variables externas, como la carga de trabajo y el número de sesiones. Los estudios futuros deben explorar más a fondo cómo estos factores afectan a la participación y los resultados para aumentar la eficacia del programa en contextos reales.
Descriptores: Atención; Atención Plena; Salud Mental; Concienciación; Pensamiento

Introduction

Mindfulness is “the awareness that emerges through purposefully paying attention to the unfolding of experiences, moment by moment, in the present moment and without judgment.[1] In 1979, Jon Kabat-Zinn developed a therapeutic intervention program called Mindfulness-Based Stress Reduction (MBSR), which popularised the concept of mindfulness and its use in Western medicine and psychology. Initially designed to treat chronic pain and stress-related disorders, MBSR consists of eight weekly two-hour group sessions, 45 minutes of daily practice at home, and a half-day retreat (six hours of formal mindfulness training) between the sixth and seventh weeks.[1] Participants learn formal meditation practices, including sitting meditation, walking meditation, yoga, and body scan, as well as how to incorporate mindfulness into their daily lives. Subsequently, programs such as Mindfulness-Based Cognitive Therapy (MBCT) and Mindfulness-Based Relapse Prevention (MBRP) were developed to address various disorders.[2]

The use of mindfulness for healthcare professionals, who play a crucial role in patient care and are particularly vulnerable to work-related stress and burnout,[3] is being increasingly studied. A recent systematic review with meta-analysis using mixed

methods[4] suggested that mindfulness can significantly reduce anxiety and depression in healthcare professionals. Qualitative and descriptive studies have also shown additional benefits that were not captured in randomized controlled trials (RCTs), such as improved well-being and work performance. Mindfulness in healthcare professionals fosters the ability to fully engage with patients and their families, with a focus on their needs and feelings.[1] Regular mindfulness practice improves self-compassion and compassion toward others as practitioners become more accepting of the present moment without judgment. This, in turn, enhances skills such as decision-making and interpersonal communication, enabling practitioners to work more effectively in groups and manage their time more efficiently.[5]

The Mindful Attention Awareness Scale (MAAS) is a quantitative measure that is used to assess mindfulness.[6] It provides a self-reported analysis of mindfulness and awareness, focusing on thoughts and feelings toward oneself.[7] This is similar to the Perceived Stress Scale (PSS-14),[8] which measures perceived stress.

While the effectiveness of mindfulness has been demonstrated in studies with intervention durations of at least eight weeks, maintaining and strengthening mindfulness can be challenging, especially when faced with intense workloads and stressors. Healthcare professionals experience emotional exhaustion from daily stressors and play a critical role in patient care. Therefore, the development of a mindfulness program aimed at improving participants' understanding of effective mindfulness practices and measuring mindfulness and awareness, with a primary focus on thoughts and feelings toward oneself, would be a very helpful strategy.

This study aims to examine adherence to an eight-week online mindfulness training program for healthcare professionals and compare the scores of the MAAS and PSS-14 before and after the program, both within and between participant groups.

Methods

This was a descriptive, before-and-after type study, in a tertiary philanthropic hospital in São Paulo. The study population consisted of 44 specialists, senior collaborators, care leaders, and coordinators from the Imaging Diagnostic Centre and Food Service. Data collection commenced on June 1, 2022, using a digital questionnaire

administered via REDCap®,[9] which encompassed sociodemographic and personal characteristics of the participants, including hobbies, involvement in other activity groups, medication usage, and availability to participate in the program. The data collection was concluded on July 28, 2022.

The following variables were analysed: sex, age, presence of a partner, race/color, education, position in the sector, work shift, workload, work attendance, adherence to the mindfulness program for eight weeks, daily mindfulness and meditation practice, use of psychotropic or continuous medications, hobbies, and participation in religious, psychotherapeutic, artistic, or music groups. In addition, the MAAS assessed 15 items on a 1–6 scale, and the PSS-14 assessed 14 items on a 0–4 scale.

For the PSS-14, questions 4 (In the past month, how often have you felt confident about your ability to handle your personal problems?), 5 (In the past month, how often have you felt that you were effectively coping with important changes that were occurring in your life?), 6 (In the past month, how often have you found yourself unable to handle all of your tasks effectively?), 7 (In the past month, how often have you felt that things were going your way?), 9 (In the past month, how often have you been able to control irritations in your life?), 10 (In the past month, how often have you felt that you were on top of things?), and 13 (In the past month, how often have you been able to control the way you spend your time?) were reverse scored from 4 to 0.[8] The sum of these questions was analysed after the scoring inversion. A higher sum indicated a higher level of perceived stress.

An experimental workshop was conducted, involving all participants who were interested and able to participate. The invitation was sent via institutional email and Workplace® (Facebook® social network for companies). Inclusion criteria consisted of showing an interest in participating in the mindfulness program. In contrast, exclusion criteria included being in the acute phase of any clinical condition or having a history of untreated psychopathological disorders, as specified in the invitation email.

The invitation included instructions to access the REDCap® link[9] containing sociodemographic questionnaires, MAAS, PSS-14, and a question regarding interest in the eight-week mindfulness program. A total of 44 participants indicated their

availability (morning, afternoon or evening) in response to the invitation email, and then signed the ICF, which encouraged adherence to the intervention and research engagement. Of the 44 participants who were initially interested, 23 attended the workshop. The 21 participants who did not participate were asked for a reason for their decision via an open-ended question. Out of the 23 workshop participants, one individual did not volunteer for the study, resulting in an adherence rate of 95.7% at the beginning of the program.

Due to time constraints, the weekly group sessions were longer than the daily home practice, and the half-day retreat was excluded. Consequently, the final intervention consisted of one-hour weekly group sessions of formal mindfulness practice. A mindfulness instructor guided these sessions, incorporating guided practice, educational content, and discussions about participants' experiences, thoughts, and bodily sensations during practice. The questionnaires were administered before and after the eight sessions of mindfulness.

The sample characteristics data were initially analysed using descriptive statistics, including the absolute number and their respective percentages. The non-parametric Wilcoxon test was employed for inferential statistics, as it is suitable for data with non-normal distribution. The calculated p-value served as evidence against the null hypothesis, with statistical significance defined as $p < 0.05$.

Confidentiality was upheld in accordance with resolution 466/2012 of the National Health Council using the REDCap® system for data collection.[9] All participants signed an informed consent form (ICF). This study has been conducted in accordance with the ethical principles established by Sociedade Beneficente de Senhoras Hospital Sírio-Libanês, approved by the Research Ethics Committee (Approval number 51209821.6.0000.5461 and number 4.990.197).

Results

The results of this investigation were categorised into two groups: participants who fully adhered to the project and participants who did not. Full adherence was defined as attending all sessions, with 45.4% (n = 9), while non-adherence was defined as absence in one or more sessions, with 54.6% (n =12).

The general characteristics of the population indicate a higher rate of women, and most participants did not fully adhere to the program, participating in fewer than eight synchronous online meetings. The majority of the 22 participants reported being married, having children, being of white ethnicity, being Catholic, and having completed higher education.

The study included professionals from the fields of nutrition (40.9%), nursing (36.4%), and biomedicine (22.7%). Among these participants, 9.1% (n = 2) were biomedical care leaders, 9.1% (n = 2) were senior biomedical professionals, 13.6% (n = 3) were diagnostic and therapeutic support service coordinators, 9.1% (n = 2) were food service coordinators, 18.2% (n = 4) were senior nurses, 4.5% (n = 1) was a diagnostic and therapeutic support service manager, 13.6% (n = 3) were food service managers, 4.5% (n = 1) was a specialist nutritionist, 13.6% (n = 3) were senior nutritionists, and 4.5% (n = 1) was a diagnostic and therapeutic support service supervisor. Most participants worked full-time (68.2%), with 90.9% working 8 hours per day, 40.9% working from Monday to Friday, 31.8% (n = 7) working 6 days with a day off, and 27.3% following other schedules.

Participants were also asked about their participation in hobbies and groups to evaluate activities conducted outside of the work environment. All participants reported not practising mindfulness, except for one person who declared being available for meditation (4.5%). The final question investigated the use of psychotropic medications, which are known to affect behavior, mood, and cognition by acting on the central nervous system. None of the participants reported using them.

Table 1 presents the descriptive analysis of the responses obtained with the MAAS before and after the intervention (eight mindfulness sessions). Response categories and their respective percentages (e.g., almost always, very frequently, somewhat frequently) are presented when statistically significant.

Table 1 - Descriptive analysis of the responses obtained using the Mindful Attention Awareness Scale (MAAS) before and after the intervention, along with the corresponding Wilcoxon test results

Question	Non-adherent		*P*	Adherent		*P*
	Before n (%)	After n (%)		Before n (%)	After n (%)	
(1) I could experience an emotion without being conscious of it until a later time.			0.564			0.257
(2) I break or spill things due to carelessness, lack of attention, or being preoccupied with other thoughts.			0.705			0.234
(3) I often struggle to maintain focus on things happening in the present.			0.480			0.279
(4) I tend to walk quickly to get where I am going without paying attention to what I experience along the way.			0.096			0.053
(5) I tend not to notice feelings of physical tension or discomfort until they really grab my attention.			0.038			> 0.999
Almost always	2 (16.7)	0 (0)		0 (0)	0 (0)	
Very frequently	6 (50)	2 (16.7)		3 (30)	4 (40)	
Relatively often	0 (0)	4 (33.3)		5 (50)	3 (30)	
Somewhat infrequently	2 (16.7)	4 (33.3)		2 (20)	3 (30)	
Very infrequently	1 (8.3)	2 (16.7)		0 (0)	0 (0)	
Almost never	1 (8.3)	0 (0)		0 (0)	0 (0)	
(6) I tend to forget a person's name almost immediately after being introduced to them for the first time.			0.357			0.527
(7) It seems like I am running on autopilot, with little awareness of my actions.			0.414			0.903
(8) I rush through activities without being truly attentive to them.			0.480			0.160
(9) I become overly focused on achieving my goal, causing me to lose sight of my current actions to reach it.			0.453			0.194
(10) I perform tasks automatically, unaware of my actions.			0.739			0.527
(11) I often find myself only half-listening to someone while simultaneously engaged in another task.			0.763			0.334
(12) I often find myself driving to places on autopilot and then questioning why I went there afterwards.			0.803			0.483
(13) I often find myself preoccupied with either the future or the past.			0.112			0.102
(14) I find myself doing things without paying attention.			0.931			0.271
(15) I snack without realizing it.			0.776			0.524

Table 2 presents the descriptive analysis of the responses obtained using the PSS-14 before and after the intervention. Response subdivisions and their respective

percentages (e.g., never, almost never, sometimes) were provided when statistical significances were found.

Table 2 - Descriptive analysis of the responses obtained with the Perceived Stress Scale 14 (PSS-14) before and after the intervention, along with the corresponding Wilcoxon test results

Question	Non-adherent		*P*	Adherent		*P*
	Before n (%)	After n (%)		Before n (%)	After n (%)	
(1) How often in the past month have you been upset due to unexpected events?			0.177			0.414
(2) Over the past month, how often have you felt a lack of control over important aspects of your life?			0.931			0.414
(3) In the past month, how often have you been nervous and stressed?			0.317			0.157
(4) In the past month, how often have you felt confident in your ability to handle your personal problems?			0.317			0.785
(5) In the past month, how often have you felt that you were effectively coping with important changes that were occurring in your life?			0.705			0.739
(6) In the past month, how often have you found yourself unable to handle all of your tasks effectively?			0.729			0.453
(7) In the past month, how often have you felt that things were going your way			> 0.999			0.317
(8) In the past month, how often have you felt that you were on top of things?			0.257			0.527
(9) In the past month, how often have you been able to control irritations in your life?			0.058			0.705
(10) In the last month, how often have you felt that you were on top of things?			0.527			0.739
(11) In the past month, how often have you felt angry about circumstances beyond your control?			> 0.999			0.429
(12) In the past month, how often have you found yourself thinking about tasks you need to complete?			0.564			0.023
Almost never	0 (0)	0 (0)		0 (0.0)	1 (10.0)	
Sometimes	2 (16.7)	1 (8.3)		2 (20.0)	5 (50.0)	
Almost always	5 (41.7)	7 (63.6)		5 (50.0)	4 (40.0)	
Always	5 (41.7)	3 (27.3)		3 (30.0)	0 (0.0)	

(13) In the past month, how often have you been able to control the way you spend your time?	0.655	> 0.999
(14) In the past month, how often have you felt overwhelmed by difficulties that seemed insurmountable?	0.480	0.414

Discussion

The adherence to the eight-week online Mindfulness training program with a facilitator was low among participants. A systematic review reported an average adherence of 56.0% in web-based mindfulness programs.[10]

Mindfulness was assessed using the Brazilian version of the MAAS, a short unidimensional scale that measures mindfulness levels based on the core aspects of the practice. The scale comprises 15 items that evaluate the individual's ability to maintain open and receptive attention to the present moment.[11]

In general, the intervention did not affect MAAS responses. However, item 5 (I tend not to notice feelings of physical tension or discomfort until they really grab my attention) showed statistical significance among participants who did not fully adhere to the program. It could be attributed to the broad definition of "non-adherence" to the program. Participants classified as "non-adherent" attended between one and seven sessions. This result should be interpreted with caution, as although it may indicate that non-adherent participants increased mindfulness due to participation in multiple sessions, the effect may be residual and does not provide consistent evidence of benefit without additional analyses or greater statistical robustness. Future research should incorporate more specific definitions of "non-adherence" to the training.

Although statistical significance was observed in a few variables, particularly item 5 of the MAAS for the non-adherent group, these results do not allow for conclusive statements about the intervention's effectiveness. Any potential cognitive or attentional benefits suggested by these findings should be viewed as preliminary and interpreted within the context of the study's limitations, including the small sample size and absence of a control group. The definition of non-adherence is b=very broad —from missing one session to attending only a few—which could still yield some benefit.

Another critical factor is workload. Participants worked long shifts, with 68.2% reporting full-time employment, which may have influenced adherence and outcomes. High workloads have been linked to increased stress and limited engagement in self-care practices, such as mindfulness.

From a scientific perspective, this study adds to the growing body of evidence that partial participation in mindfulness interventions may still lead to measurable cognitive changes. Despite the limited statistical power, the findings align with similar studies conducted in healthcare settings and support the potential benefits of mindfulness, even in time-constrained environments.

The PSS-14 assesses the perceived level of stress in various situations. It is a general instrument that can be utilized with different age groups, ranging from adolescents to older individuals, and it does not consist of context-specific questions.[12] Similar to the MAAS, the responses were divided into two groups (fully adherent or not fully adherent) and four subcategories (fully adherent and responded before, fully adherent and responded after, not fully adherent and responded before, and not fully adherent and responded after). The questionnaire was administered twice: before and after the intervention.

Like the MAAS, the PPS-14 did not show any differences in participant responses. The non-adherent group showed no statistically significant difference in responses before and after the intervention. In the adherent group, the statistical significance was only found for question 12 (In the past month, how often have you found yourself thinking about tasks you need to complete?). This group reported thinking less about what they had to accomplish after the intervention.

Despite mindfulness being widespread internationally, it has been scarcely studied in Brazil. Therefore, this study analysed the impact of adhering to a mindfulness program among professionals from a philanthropic tertiary care hospital. Numerous studies have demonstrated the necessity of addressing the physical and psychological consequences of work stress and burnout among healthcare professionals, encompassing both working conditions and self-care strategies.

Recent studies have analysed an eight-week mindfulness program, which has presented significant results regarding the reduction of several stress-related factors. These factors include improved general well-being and emotion regulation, as well as reduced burnout, depression, anxiety, and perceived stress.[12] Mindfulness programs have been introduced in healthcare services by healthcare professionals to improve clinical outcomes in both clinical and non-clinical settings, such as companies, schools, and other community organizations. The hospital setting is suitable for this type of program, as it demonstrates evident improvements in well-being after the intervention.

The study population consisted of professionals in various positions, including biomedical care leaders, senior biomedical specialists, diagnostic and therapeutic support service coordinators, manager supervisors, food service coordinators and managers, and specialist and senior nutritionists. Numerous studies have linked work stress to nurses and physicians in the bedside care team. Bianchini and Copeland (2020)[13] evaluated 220 physicians and 250 nurses, reporting higher stress levels, particularly among women.

Mindfulness-based interventions have been widely used globally. A study analysed the effects of a 4-week mindfulness training for nurses, showing a reduction in anxiety and an increase in job satisfaction. The intervention was effective in improving the participants' well-being.[14] In a randomised clinical trial,[15] mindfulness was found to be a well-tolerated treatment with comparable efficacy to a first-line drug for patients with anxiety disorders. The present study differed from these previous studies as the participants held administrative positions and were not directly involved in patient care. This variation in domains may hinder comparisons, even when focusing on health.

Our results showed little difference in the MAAS regarding questions related to emotional aspects. Responses differed before and after the mindfulness intervention, especially for participants who wholly adhered to the program. Two participants chose “somewhat frequent” before the intervention, while six chose it after. Although this relationship has minimal significance, a larger sample size may demonstrate emotional improvement.

Another crucial factor to consider is workload. A study involving nurses indicated that high workload can lead to emotional overload, triggering mental disorders such as

anxiety, stress and depression.[16] The present study supports these findings, with 68.2% of participants working full-time, 40.9% working from Monday to Friday, and 31.8% working six days with only one day off. Working hours are crucial because regular schedules have a significant impact on well-being, fatigue, stress and physical pain.

A study explored the effectiveness of a brief mindfulness-based intervention in reducing stress, anxiety and depression among nurses at a public teaching hospital.[17] Thirty-five nurses participated in a one-day workshop, monthly group practice sessions, and daily follow-up via a social messaging group. Stress, anxiety and depression were measured before and after the intervention using validated scales. The results showed a statistically significant reduction in perceived stress and anxiety. The intervention was effective in reducing stress and anxiety among nurses.

As demonstrated in this study, the benefits of mindfulness include increased self-awareness. Following the intervention, the score on question 5 of the MAAS (I tend not to notice feelings of physical tension or discomfort until they really grab my attention) was higher.

The analysis of physical aspects using the MAAS revealed an enhanced perception of physical discomfort, along with a decrease in reports of "I tend to walk quickly to get where I am going without paying attention to what I experience along the way" (question 4). Conversely, no significant differences were observed in emotional aspects.

Furthermore, a study aimed at evaluating the feasibility and acceptability of a Mindfulness-Based Stress Reduction (MBSR) training program and examining mental health variables, focusing on both positive and negative symptoms among thirty healthcare professionals participating in a pre-post intervention study, showed significant improvements in mindfulness, personal accomplishment (burnout), sleep quality, positive emotions, and self-efficacy, with a decrease in emotional exhaustion, stress, negative emotions at work, and worry. No significant changes were found in mental distance (burnout) and work engagement. The study suggests that MBSR was feasible and acceptable for healthcare professionals.[18]

This study addresses a pertinent issue by evaluating the impact of mindfulness programs on healthcare professionals, a group often facing high-stress levels. The inclusion of various professional roles within the healthcare setting provides a broad perspective on the potential impact of mindfulness interventions. Using the Brazilian version of the MAAS and PSS-14 ensures the reliability of the measures for assessing mindfulness and perceived stress. There are still relatively few studies that investigate interventions in groups of online and recorded healthcare professionals. The scientific community must continue to research and assess the actual effectiveness of mindfulness programs in larger groups.

The main limitations of this study were the small sample size and the absence of a control group. The sample is predominantly female, highly educated, and of white ethnicity, which may not be representative of the broader population, and the turnover rate of research participants was too high. The broad definition of “non-adherent” — which ranged from missing a single session to minimal participation — may have masked internal differences and hindered the interpretation of effects. Moreover, most studies on this subject primarily focus on professionals on the frontline of care, who have distinct routines and stressors compared to those analysed in the present study. These factors likely influenced the results presented, thus necessitating further research to examine professionals' adherence to mindfulness and the subsequent changes it induces.

Numerous studies suggest that this type of program can effectively enhance healthcare professionals’ awareness, well-being, interpersonal relationships, and overall health. These findings underscore not only the relevance and necessity of mindfulness programs for this population but also the need for further research in Brazil.

Conclusion

The adherence to the eight-week online mindfulness training program was low among participants; however, MAAS responses suggested improvements in attention and awareness for both groups, with only one specific item showing a statistically significant change. Interestingly, the non-adherent group demonstrated improvement in MAAS item 5, which may reflect a partial benefit from attending some sessions. The PSS-

14 showed statistical improvement in the adherent group regarding intrusive task-related thoughts. These findings indicate that, even with low adherence, interventions adapted to the work reality of healthcare professionals may promote subtle but relevant benefits in stress management and self-regulation of attention.

From an institutional perspective, these findings highlight the importance of designing mindfulness interventions that are flexible and compatible with the workload and organizational culture of healthcare services. Strategies such as shorter, more frequent sessions, integration into work routines, and managerial support for participation may increase adherence and maximize potential benefits for staff well-being and patient care. Although the program's results have limited statistical significance overall, the mindfulness program may still have a subtle impact on self-perception and cognitive presence. Understanding the factors that affect adherence, such as workload and occupational profile, may guide more effective implementation strategies in healthcare services. Further studies with larger samples and control groups are needed to understand the impact of mindfulness programs.

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