RESEARCH ARTICLE

Evaluation of Breathworks' Mindfulness for Stress 8-week course: Effects on depressive symptoms, psychiatric symptoms, affects, self-compassion, and mindfulness facets in Brazilian health professionals

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Abstract

Objectives: This study was aimed to evaluate the effects of the Breathworks' Mindfulness for Stress 8-week course on depressive and psychiatric symptoms, and on positive and negative affects, compared with active control and wait list.

Method: A total of 84 primary care health professionals enrolled in the study, in quasi-experimental research design. The scales Beck Depression Inventory, Self-Reporting Questionnaire, Positive and Negative Affect Schedule, Self-Compassion Scale, and Five Facets of Mindfulness Questionnaire were applied before and after the interventions.

Results: Depressive symptoms, psychiatric symptoms, and negative affects had a statistically significant decrease before postintervention evaluations in Mindfulness for Stress group, and the levels of self-compassion and observe and non-reactivity dimensions of mindfulness improved after the intervention.

Conclusions: The Mindfulness for Stress program can be considered a feasible group intervention to improve the mental health of healthcare professionals.

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1 | INTRODUCTION

Mindfulness meditation comes from the Buddhist tradition, and recently had secular versions developed for application as health promotion interventions. According to Bishop et al. (2004) mindfulness practice is defined as self-regulation of attention involving sustained attention, attention switching, and inhibition of secondary processing of the experience, adopting an orientation towards one's experiences that is characterized by curiosity, openness, and acceptance. The mindfulness practice involves a direct experience of events in the body and the mind, including breath, bodily sensations, perceptions (e.g., sights and sounds), emotions and cognitions, instead of thought elaborations about the experience and its origins, implications, and associations (Teasdale, Segal, & Williams, 1995). Another definition describes mindfulness as a state of alertness and lively awareness expressed in an active information processing sensible to the context (Kabat-Zinn, 2003; Langer & Moldoveanu, 2000), an inherent capacity of all humans that shows great variation in the extent to which it is utilized between, and within, individuals (Brown & Ryan, 2003).

In the health care context, mindfulness interventions are usually delivered in group settings, and earlier studies were focused in chronic pain treatment (Kabat-Zinn, 1982; Kabat-Zinn, Lipworth, & Burney, 1985). Several studies demonstrated improvement in other health outcomes, such as sleep (Black, O'Reilly, Olmstead, Breen, & Irwin, 2015; Ong et al., 2014), immunity (Black & Slavich, 2016; Davidson et al., 2003), blood pressure (Curiati et al., 2005; Hughes et al., 2013), and pain (Cusens, Duggan, Thorne, & Burch, 2010; Zeidan & Vago, 2016; Zeidan et al., 2015). The effects of mindfulness-based interventions on psychological and psychiatric symptoms are also noteworthy, with positive outcomes on stress (Shapiro, Schwartz, & Bonner, 1998; Taren et al., 2015), professional burnout symptoms (Cohen-Katz, Wiley, Capuano, Baker, & Shapiro, 2004; Luken & Sammons, 2016), anxiety symptoms (Hoge et al., 2017; Kabat-Zinn et al., 1992), depressive symptoms (Sephton et al., 2007; Strauss, Cavanagh, Oliver, & Pettman, 2014), and prevention of depressive relapse or recurrence (Kuyken et al., 2015).

Mindfulness training decreases cognitive and emotional reactivity (Shapiro, Astin, Bishop, & Cordova, 2005), increases self-kindness, an adaptive emotion regulation strategy which is part of the multidimensional construct called self-compassion, and decreases rumination, a source of psychological distress (Boyle, Stanton, Ganz, Crespi, & Bower, 2017). Self-compassion is associated with lower depressive symptoms (MacBeth & Gumley, 2012), and according to Neff (2003a), it has three components: Self-kindness which entails being warm and understanding towards oneself when experiencing suffering, failure or feeling inadequate rather than being self-critical; Shared Humanity which is to notice what is common between one's own experiences and other people's experience rather than focusing on differences; and Mindfulness which is to notice painful thoughts and feelings without overidentifying with them. Rumination can be defined as repetitive thoughts about the possible causes or conditions that lead to discomfort and has been found to be associated with heightened vulnerability to experience major depressive episodes (Liu et al., 2017).

Workplace stress is high among healthcare professionals and is associated with increased risk of burnout (O'Dea, O'Connor, Lydon, & Murphy, 2017; Rabatin et al., 2016), stress (Shanafelt et al., 2015), depressive symptoms, and psychiatric symptoms (da Silva, Lopes, de, Susser, & Menezes, 2016). This can occur for several reasons such as the emotional burden generated by contact with illness and suffering, the tension created between the needs of the health system users, the scarce resources available, and the growing demand to increase health care indicators even with a shortage of resources. In a population-based study conducted in the city of São Paulo, Brazil, the major depressive disorder prevalence was about 9.4% (Andrade et al., 2012), whereas another study conducted with primary care workers in São Paulo (da Silva et al., 2016) identified 36.3% of depressive symptoms

prevalence, and 16% of probable major depression prevalence indicating that occupational stressors could be harmful to the psychological health in health professionals. These symptoms may lead to absenteeism, reduced work capacity, and reduced emotional competence and empathy in health care (Krasner et al., 2009).

Aiming to reduce psychological symptoms and to help develop greater compassion for themselves, their coworkers, and their patients, Shapiro et al. (2005) offered to healthcare professionals the standard mindfulness-based stress reduction (MBSR) program with the addition of a "loving kindness" meditation. Those who underwent the program demonstrated a significant reduction in perceived stress and increase in self-compassion. Fortney, Luchterhand, Zakletskaia, Zgierska, and Rakel (2013) found results in the same direction with an abbreviated 3 days mindfulness-based intervention. Irving, Dobkin, and Park (2009) reviewed several studies showing that mindfulness training can promote self-care and well-being, and could increase empathy in healthcare professionals with similar results later being found by Lamothe, Rondeau, Malboeuf-Hurtubise, Duval and Sultan (2016) in a systematic review of MBSR outcomes. Burton, Burgess, Dean, Koutsopoulou, and Hugh-Jones (2017) found a moderate effect on health professionals stress levels in a systematic review and meta-analysis indicating that through reducing staff stress, mindfulness-based interventions could also benefit patients and healthcare users. Compassionate behavior, which can be described as empathizing and engaging with patient needs, is an important skill in healthcare and may be developed through practices that enhance self-compassion in health professionals (Gustin & Wagner, 2013; Raab, 2014).

The Mindfulness for Stress program (MfS) was developed based on the Mindfulness-Based Pain Management program (MBPM) (Burch, 2008), which has shared elements with MBSR, such as a class structure that includes psychoeducation, formal meditation and movement practices, teacher-led discussion and inquiry, and daily home practices and exercises. Breathworks is sensitive to the concerns of teaching mindfulness outside the original ethical framework in which it was established, developing its mindfulness programs within the Buddhist foundation of "loving kindness." The MBPM program has presented effects on well-being measures in patients with chronic pain, with large effects on pain acceptance, and a trend towards increased awareness of pleasant affects, providing further support for the role of acceptance and awareness in mindfulness effects (Cusens et al., 2010).

The MfS course structure is called "the 6-step process," which is a progressive model of awareness development and cultivation of qualities such as curiosity, acceptance, compassion, shared humanity, empathic joy, perspective, and equanimity (as described in Table 1). MfS, as well as MBSR, invites participants to explore all the experiences with a sense of gentleness and acceptance towards them, and to use the breath to soften tension, resistance or suffering related to what is noticed during the practice, and to include the loving kindness practices aiming the development of self-compassion and compassion for other people. MfS has an addition over MBSR which is the presence of specific group dynamics and meditations to reinforce the sense of connection and shared humanity with all persons, and also differs from MBSR in the typical number of group participants (usually 4–15 participants in MfS against 15–40 participants in MBSR), and in the total course time, as MBSR has an "all-day" class (a silent retreat day) between the 6th and 7th sessions on a weekend day as part of its curriculum.

Self-compassion and compassion towards others can help reduce isolation and support a deeper connection to the common human experience of suffering and compassion (Hennessey, 2016). The contribution of compassion and self-compassion to reduce stress and psychological symptoms was extensively addressed by Buddhist psychology and recently received contributions in secular psychology (Gilbert, 2010; Neff, 2003a). Recently a meta-analysis linked higher levels of compassion and self-compassion to lower levels of stress and psychopathology (MacBeth & Gumley, 2012).

1.1 | Rationale for Breathworks Mindfulness for Stress 8-week program among health professionals

There are reasons to hypothesize that the MfS 8-week program may be helpful for healthcare professionals. First, healthcare professionals are at a higher risk to develop depressive symptoms (DS) and psychiatric symptoms (PS) than the general population (da Silva et al., 2016; Mata et al., 2015), and some mindfulness-based interventions had demonstrated beneficial effects on emotional health for this population (Shapiro et al., 2005; Asuero et al., 2014;

TABLE 1 Breathworks' mindfulness for stress course structure (Hennessey, 2016)

Week	Key elements	Session practices	Step
1	−What is mindfulness? −Autopilot −Primary and secondary experience −Reacting and responding	−Raisin meditation −Body-scan	1 −Awareness (learning to become aware of our experience)
2	−Doing and being modes of mind −Perceptual and conceptual modes of mind	−Body-scan −Mindfulness of breathing	
3	−Meditation as movement −Thoughts are not (necessarily) facts	−Mindful movements −3-min breathing space −Mindfulness of thoughts (open monitoring)	
4	−"Charged" thoughts −Accepting difficult experiences −The paradox of mindfulness	−Mindfulness of breathing −Acceptance with kindness meditation −Mindful movements	2 −Acceptance and self-compassion (approaching the unpleasant)
5	−Negativity bias −Noticing the pleasures and positive experiences in our lives	−Body-scan −Letting in the good −Mindful movements	3 −The treasure of pleasure (going to pleasant feelings)
6	−The three major emotion systems −Kindness to self −Self-kindness versus self-criticism	−Mindful movement into mindfulness of breathing −"Kindness to self" meditation	4 −Perspective and equanimity (expanding our consciousness to become "a bigger container")
7	−Connecting with others −The exhaustion funnel	−"Kindness to self and to a friend" meditation −"Kindness to others" meditation	5 −Connection and shared humanity
8	−Course review −Looking to the future	−Body-scan with self-kindness −Following hands into the breath into kindness	6 −Live with choice (choose instead of reacting)

Auserón et al., 2018). Second, MfS has the aim to increase positive attitudes like self-compassion (SC), foster experiential acceptance, decrease rumination, and cognitive and emotional reactivity, mechanisms considered to be responsible for decreasing DS and PS. And third, to promote SC in healthcare professionals which can improve compassionate behaviors when they are caring for others (Gustin & Wagner, 2013).

The purpose of the current study was to investigate the outcome of MfS on DS, PS, and positive and negative affects, measured by self-reported questionnaires, compared with the results of active control (AC) intervention based on relaxation techniques and a wait list (WL) group. The main hypotheses of the study were that MfS would (a) decrease DS and PS, (b) increase positive affects (PA), and (c) decrease negative affects (NA). We also hypothesized that the MfS intervention would have positive benefits of (a) increasing SC and (b) increasing the five dimensions of mindfulness. This is the first published study examining the effects of MfS program.

2 | METHODS AND MATERIALS

This study was performed in Porto Alegre, southern Brazil. The protocol was approved by the institutional ethics committee (approval number: 14-0192 GPPG/HCPA), the procedures followed the Helsinki Declaration of 1975, and all participants provided informed consent.

2.1 | Participants

Participants of the study were healthcare professionals from the primary healthcare system (e.g., physicians, nurses, nursing technicians, social workers, dentists, nutritionists, speech therapists, psychologists, and community health agents) in Porto Alegre. Recruitment consisted of posting flyers around the primary care health units and sending out e-mails describing the free stress management program for healthcare professionals. The flyers and e-mails explained that the intention of the program was to reduce stress, decrease DS and PS, and increase overall well-being. Inclusion criteria included being a current healthcare professional and aged 18–65 years. Exclusion criteria included having a systematic personal practice of meditation in the previous year, being shift workers, having severe psychiatric comorbidity, being pregnant, and having alcohol or drug abuse. Severe psychiatric comorbidity is defined as a disease that requires lifelong treatment because of social or work incapacity risk such as schizophrenia or bipolar disorder. The information regarding the inclusion and exclusion criteria was collected through self-report by email.

A total of 84 health professionals enrolled in the study, and after giving the informed consent participants who met the enrollment criteria completed the baseline evaluation (preintervention). The participants were divided into three groups: WL, AC, and MfS group. The allocation to each group was according to the day of first evaluation: the first group allocated to MfS, the second to WL, the third to AC, and the next group to MfS again. This quasi-experimental design was chosen to include participants that came from the same health units in the same intervention groups.

The mean age was 41.6 years old (standard deviation [SD] = 10.6), ranging from 22 to 64 years old, and 95.2% were female. Dropout was defined as the absence in the postintervention evaluation in the WL group, or nonparticipation in at least 3 of the 4 meetings of the AC group or nonparticipation in at least 5 of the 8 meetings of the MfS group, and according to these criteria 66.3% of the participants completed the study. We assessed the patients' preintervention scores, before starting the groups, and the postintervention scores, after the end of the groups, which lasted 8 weeks.

2.2 | Interventions

In the WL groups participants were assessed two times, at baseline and after 8-weeks, with the same time interval that AC and MfS groups were assessed, and no other intervention was conducted.

In the AC groups, participants attended four bi-weekly group sessions. Each session lasting 2 hr. In these sessions, they were guided through relaxation exercises usually delivered in Cognitive Behavioral Therapy (such as deep breathing, diaphragmatic breathing, square breathing, progressive muscle relaxation, stretching, and creative visualization) with an intentional focus to relaxing during the practices. The objective of these practices was to release bodily tension, leading to a decreased arousal state known as relaxation response (Benson, Greenwood, & Klemchuck, 1975) that usually contributes to reducing stress and DS and PS. Participants were encouraged to practice the exercises as homework for about 20 min each day as well as every time they felt nervous or anxious. They did not receive audios or other material to support home practice.

In the MfS groups, participants attended eight weekly group meetings (each lasting 2 hr) in which they were guided through a progressive experiential exploration of mindfulness (Hennessey, 2016). Practices included body-scan, breath awareness, mindful movements, kindly awareness, and mindfulness in daily life. The body scan practice involves guiding awareness through each part of the body and noticing the presence of sensations without reacting to them (just noticing the tension of a muscle as opposed to trying to relax a tense muscle). This enabled contact with the actual sensations of the body, instead of thinking about these sensations. Breath awareness began with an awareness of the experience of breathing without modifying the depth or the rhythm of the breath. Practices also included awareness of the sounds, emotions, body sensations, and thoughts (just noticing a thought as it arises as opposed to trying actively to change the thought), with the breath as an anchor to the attention. The mindful

movements involved bringing awareness to physical activity, thus allowing movement of the body within the limits of its physical capability. This is taught by means of a comprehensive sequence of movements based on yoga and Tai Chi. "Kindly awareness" is a set of practices concerned with the development of four aspects: loving-kindness, compassion, joy, and equanimity. In the loving-kindness meditation there are five stages in which the individual brings a kindly attitude and intention to (a) a friend, (b) themselves, (c) someone neutral to the person's life, (d) someone with whom there is a somewhat difficult relationship, and (e) all five persons together. Throughout each stage, awareness of the commonality between human experiences of pushing away pain and searching for ease and happiness was guided. Mindfulness in daily life involves bringing awareness to ordinary, everyday life, including eating, sleeping, and habitual behavior. Participants were given homework composed of formal practices meditation to be performed twice a day (using 10 min audio-guided records) and informal practices like eating or walking mindfully, paying attention to pleasant experiences or staying for some time in nature daily.

2.3 | Assessments

We used the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) to measure DS. The Brazilian Portuguese version (Gomes-Oliveira, Gorenstein, Lotufo Neto, Andrade, & Wang, 2012) of BDI is a 21-question-self-report questionnaire, each ranging from 0 to 3. Higher scores indicate more severe DS.

PS was assessed using the Self-Reporting Questionnaire (SRQ-20; World Health Organization, 1994). The Brazilian Portuguese version (Mari & Williams, 1986; Paraventi, Cogo-Moreira, Paula, & de Jesus Mari, 2015) of SRQ-20 is an instrument with 20 questions about common mental health symptoms and problems, also called neurotic symptoms, and the factors "Anxiety/Depression," "Disability," and "Somatic symptoms" represented the latent structure of SRQ-20 in the validation study in the Brazilian population.

PA and NA were measured with the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The Brazilian Portuguese version (Pires, Filgueiras, Ribas, & Santana, 2013) of PANAS is divided into two 10-item scales that assess feelings of activeness, enthusiasm, and alertness (i.e., PA), and subjective distress and unpleasant engagement (i.e., NA).

SC was measured with the Brazilian Portuguese version (Souza & Hutz, 2016) of the SC Scale (SCS; Neff, 2003b). After reversing the negative-worded items, a total score can be calculated with higher scores indicating greater SC. The SCS total score can range from 24 to 120.

Mindfulness was assessed with the Five Facets of Mindfulness Questionnaire (FFMQ; Baer et al., 2008). The Brazilian Portuguese version of FFMQ (Barros, de, Kozasa, Souza, & Ronzani, 2014) is a 39-item scale that measures five facets: observe (to attend to or to notice internal and external stimuli), describe (to notice or to label mentally these stimuli), act with awareness (to attend to current actions instead of to behave automatically), non-judging (to refrain from evaluating sensations, cognitions, and emotions), and non-reactivity (to allow thoughts and feeling to come and go without reacting to them).

2.4 | Statistical analyses

Data were expressed as means ± standard error, and n (%). We used one-way analysis of variance, the chi-square test, and the Kruskal Wallis test to compare demographic variables between WL, AC, and MfS groups. We performed Generalized Estimating Equations (GEE) to compare DS, PS, PA, NA, SC, and FFMQ scores between WL, AC, and MfS groups before and after the interventions, and all the statistical significance results (p) were expressed as multiple comparisons corrected p value according to Bonferroni's correction.

We calculated the effect sizes comparing delta scores (preintervention scores minus postintervention scores) of MfS group over WL group, and of MfS group over AC group using Hedges'g measure and its 95% confidence interval (CI); of DS, PS, PA, NA, SC, and mindfulness facets. PASW Statistics Version 18 was used for all statistical analyses (SPSS Inc. Chicago, IL). Statistical significance was set at $p < 0.05$.

TABLE 2 Comparisons of demographic characteristics between wait list, active control, and mindfulness groups

	Wait list n = 23	Active control n = 38	Mindfulness n = 25	All n = 86	F or chi-square (p)
			Mean (SD) or n (%)		
Age[#]	42.59 ± 9.83	39.16 ± 11.38	44.32 ± 9.70	41.60 ± 10.63	1.93 (0.152)
Sex female[£]	20 (90.9%)	36 (97.3%)	24 (96.0%)	80 (95.2%)	1.29 (0.525)
Hours of work during week[§]	40.86 ± 8.09	39.89 ± 3.85	39.16 ± 8.38	39.91 ± 6.62	0.55 (0.760)
Income ($)[§]	1242 ± 1043[a]	1130 ± 687[a]	1667 ± 858[b]	1321 ± 866	6.38 (0.041)
Education level[£]					
First grade	1 (4.5%)	1 (2.7%)	1 (4.0%)	3 (3.6%)	3.54 (0.739)
Second grade	9 (40.9%)	12 (32.4%)	5 (20.0%)	26 (31.0%)	
Graduation	3 (13.6%)	9 (24.3%)	5 (20.0%	17 (20.2%)	
Postgraduation	9 (40.9%)	15 (40.5%)	14 (56.0%)	38 (45.2%)	

Note. SD: standard deviation.
Comparison between groups using one way ANOVA[#], chi-square test[£], and independent samples Kruskal Wallis test[§]. Different letters (a,b) mean statistically significant differences.

3 | RESULTS

Of the 23 participants allocated to the WL group, only 39.1% of the participants completed the postintervention evaluation (dropout rate of 60.9%). The baseline characteristics of the participants who continued in the research and the participants who dropped out were compared and they had no differences in socio-demographic characteristics, DS, PS, PA, NA, SC, and mindfulness facets (using the chi-square test and Mann–Whitney test). In AC group 27 of 38 participants completed the intervention and participated in postintervention evaluation (dropout rate of 28.9%), and in the MfS group 21 of 25 participants completed the intervention and participated in postintervention evaluation (dropout rate of 16.0%).

Comparisons of demographic characteristics for age, sex, work, income, (in US dollars) and education level, are presented in Table 2. The groups were similar for age, hours of work during a week, and educational levels, and MfS group presented a significantly higher income ($1667 ± 858) than WL and AC groups ($1242 ± 1043 and $1130 ± 687, respectively). Most of the participants had postgraduate degrees. A 66.3% of the participants were married or cohabitating, 19.3% were single, 2.4% were widowed, 9.6% were divorced, and 2.4% others. The participants in our research were currently active healthcare professionals (not in work license due to health problems, or being more specific, due to mental health problems), with a mean of 11.87 ± 8.58 DS score and a mean of 6.82 ± 4.70 PS score.

In the GEE model (Table 3), significant time × intervention interactions were found for the following variables: DS, PS, NA, SC, and mindfulness facets of observe and non-reactivity. The DS scores were significantly lower for AC (11.30 to 8.96 $p = 0.015$) and MfS (11.64 to 2.71 $p < 0.001$) groups at postintervention compared with preintervention evaluation, as well as PS scores for AC (7.11 to 5.21 $p = 001$) and MfS (6.44 to 1.80 $p < 0.001$) groups. NA was lower (27.80 to 20.43 $p < 0.001$) at postintervention evaluation in MfS group, comparing to baseline scores. Scores of SC 78.32–92.45 $p = 0.002$) and observe 27.48–30.86 $p = 0.003$), non-judging 26.28–31.07 $p < 0.001$) and nonreactivity 20.32–22.86 $p = 0.008$) of mindfulness facets were significantly higher at MfS postintervention evaluation comparing to baseline scores. The score of nonreactivity (20.04 to 15.11 $p = 0.041$) was significantly lower at the postintervention evaluation in the WL group in comparison to baseline scores.

Both AC and MfS interventions had statistically significant differences between baseline and postinterventions DS and PS scores. Compared to the WL group, individuals in the MfS group demonstrated greater decreases in DS and PS and greater increases in observe and nonreactivity scores (Table 4 and Figure 1), with the effect sizes

TABLE 3 Comparison of depressive symptoms, psychiatric symptoms, positive affects, negative affects, self-compassion, and mindfulness facets scores between pre and postintervention times in wait list, active control, and mindfulness groups

	Wait list			Active control			Mindfulness			Group × time interaction	
	Pre	Post	p	Pre	Post	p	Pre	Post	p	Wald chi-square	p
Depressive symptoms	13.04 ± 1.34	12.07 ± 1.20	0.325	11.30 ± 1.17	8.96 ± 1.35	0.015	11.64 ± 2.30	2.71 ± 0.84	<0.001	9.266	0.010
Psychiatric symptoms	6.78 ± 0.84	6.60 ± 0.83	0.713	7.11 ± 0.69	5.21 ± 0.74	0.001	6.44 ± 1.14	1.80 ± 0.56	<0.001	14.488	0.001
Positive affects	28.96 ± 1.29	30.45 ± 2.78	0.594	28.97 ± 1.16	29.81 ± 1.27	0.446	30.80 ± 1.17	33.44 ± 1.64	0.086	0.921	0.631
Negative affects	29.96 ± 2.42	30.31 ± 2.09	0.861	27.54 ± 1.43	25.30 ± 1.62	0.071	27.80 ± 1.63	20.43 ± 1.22	<0.001	8.272	0.016
Self-compassion	76.22 ± 4.84	77.85 ± 3.65	0.666	77.84 ± 2.88	77.95 ± 3.14	0.970	78.32 ± 3.62	92.45 ± 4.25	0.002	6.648	0.036
Mindfulness facets											
Observe	25.35 ± 1.29	22.30 ± 2.19	0.166	26.57 ± 1.38	27.11 ± 1.23	0.615	27.48 ± 1.08	30.86 ± 1.13	0.003	7.750	0.021
Describe	26.48 ± 1.42	25.17 ± 2.04	0.454	26.73 ± 1.04	27.45 ± 1.23	0.378	27.12 ± 1.37	27.97 ± 1.51	0.628	1.176	0.555
Awareness	30.96 ± 1.13	31.38 ± 1.93	0.797	29.43 ± 1.15	31.07 ± 1.08	0.055	29.64 ± 1.45	32.40 ± 1.01	0.060	1.119	0.572
Nonjudging	24.61 ± 1.33	26.62 ± 1.12	0.182	24.46 ± 1.44	25.87 ± 1.01	0.072	26.28 ± 1.20	31.07 ± 1.13	<0.001	4.595	0.101
Nonreactivity	20.04 ± 2.20	15.11 ± 1.04	0.041	18.78 ± 0.84	18.73 ± 0.83	0.953	20.32 ± 1.03	22.86 ± 0.96	0.008	9.891	0.007

Values expressed as means ± standard error; df = 2.

Pairwise comparisons between preintervention and postintervention scores using generalized estimating equations.

p Values are expressed with Bonferroni correction.

Group × time interaction present the interaction between the 3 groups × 2 times of evaluation, using generalized estimating equations.

TABLE 4 Comparison of postintervention scores of depressive symptoms, psychiatric symptoms, positive affects, negative affects, self-compassion, and mindfulness dimensions between wait list and mindfulness groups and between active control and mindfulness groups

	Wait list	Mindfulness	CI 95% for difference	p	Effect size (CI 95%)
Depressive symptoms	12.07 ± 1.20	2.71 ± 0.84	(−12.86, −5.84)	<0.001	0.80 (0.00, 1.61)
Psychiatric symptoms	6.60 ± 0.83	1.80 ± 0.56	(−7.20, −2.39)	<0.001	0.87 (0.06, 1.68)
Positive affects	30.45 ± 2.78	33.44 ± 1.64	(−4.73, 10.72)	1.000	0.07 (−0.72, 0.86)
Negative affects	30.31 ± 2.09	20.43 ± 1.22	(−15.67, −4.08)	<0.001	0.63 (−0.17, 1.43)
Self-compassion	77.85 ± 3.65	92.45 ± 4.25	(1.25, 28.05)	0.018	0.54 (−0.25, 1.34)
Mindfulness facets					
Observe	22.30 ± 2.19	30.86 ± 1.13	(2.66, 14.46)	0.002	0.92 (0.10, 1.74)
Describe	25.17 ± 2.04	27.97 ± 1.51	(−3.30, 8.88)	0.817	0.19 (−0.59, 0.98)
Awareness	31.38 ± 1.93	32.40 ± 1.01	(−4.20, 6.24)	1.000	0.31 (−0.48, 1.09)
Nonjudging	26.62 ± 1.12	31.07 ± 1.13	(0.64, 8.26)	0.016	0.50 (−0.29, 1.29)
Nonreactivity	15.11 ± 1.04	22.86 ± 0.96	(4.35, 11.15)	<0.001	1.25 (0.40, 2.10)
	Active control	**Mindfulness**	**CI 95% for difference**	**p**	**Effect size (CI 95%)**
Depressive symptoms	8.96 ± 1.35	2.71 ± 0.84	(−10.06, −2.43)	<0.001	0.82 (0.22, 1.41)
Psychiatric symptoms	5.21 ± 0.74	1.80 ± 0.56	(−5.63, −1.18)	0.001	0.67 (0.08, 1.26)
Positive affects	29.81 ± 1.27	33.44 ± 1.64	(−1.32, 8.60)	0.238	0.38 (−0.19, 0.96)
Negative affects	25.30 ± 1.62	20.43 ± 1.22	(−9.72, −0.02)	0.048	0.63 (0.05, 1.21)
Self-compassion	77.95 ± 3.14	92.45 ± 4.25	(1.90, 27.18)	0.018	0.74 (0.16, 1.32)
Mindfulness facets					
Observe	27.11 ± 1.23	30.86 ± 1.13	(−0.26, 7.74)	0.076	0.40 (−0.18, 0.97)
Describe	27.45 ± 1.23	27.97 ± 1.51	(−4.16, 5.19)	1.000	0.02 (−0.54, 0.58)
Awareness	31.07 ± 1.08	32.40 ± 1.01	(−2.21, 4.88)	1.000	0.20 (−0.37, 0.76)
Nonjudging	25.87 ± 1.01	31.07 ± 1.13	(1.58, 8.82)	0.002	0.63 (0.05, 1.20)
Nonreactivity	18.73 ± 0.83	22.86 ± 0.96	(1.09, 7.17)	0.003	0.49 (−0.09, 1.07)

Note. CI: confidence interval.

Values expressed as means ± standard error

Differences in pairwise comparisons using generalized estimating equations with Bonferroni correction for multiple comparisons between active control and mindfulness groups postintervention scores.

Effect size between delta scores (postintervention scores-preintervention scores) of wait list × mindfulness and active control × mindfulness, calculated using Hedges' *g* and presented as *g* (CI 95%).

(Hedges' *g*) of 0.80 (95% CI: 0.00, 1.61; *p* < 0.01) in DS scores; of 0.87 (95% CI: 0.06, 1.68; *p* < 0.01) in PS scores; of 0.92 (95% CI: 0.10, 1.74; *p* = 0.02) in observe scores; and of 1.25 (95% CI: 0.40, 2.10; *p* < 0.01) in nonreactivity scores. Compared to the AC intervention, the MfS intervention presented a greater decrease in DS, PS, and NA scores, and greater increase of SC and nonjudging scores (Table 4 and Figure 1), with the effect sizes (Hedges' *g*) of 0.82 (95% CI: 0.22, 1.41; *p* = 0.01) in DS scores; of 0.67 (95% CI: 0.08, 1.26; *p* = 0.02) in PS scores; of 0.63 (95% CI: 0.05, 1.21; *p* = 0.03) in NA scores; of 0.74 (95% CI: 0.16, 1.32; *p* = 0.01) in SC scores; and of 0.63 (95% CI: 0.05, 1.20; *p* = 0.03) in nonjudging scores; and of 0.49 (95% CI: − 0.09, 1.07; *p* < 0.01) in nonreactivity scores.

4 | DISCUSSION

We hypothesized that MfS would decrease DS and PS, increase PA, and decrease NA, and we also hypothesized that the MfS intervention would increase SC and the five facets of mindfulness in health professionals. The levels of
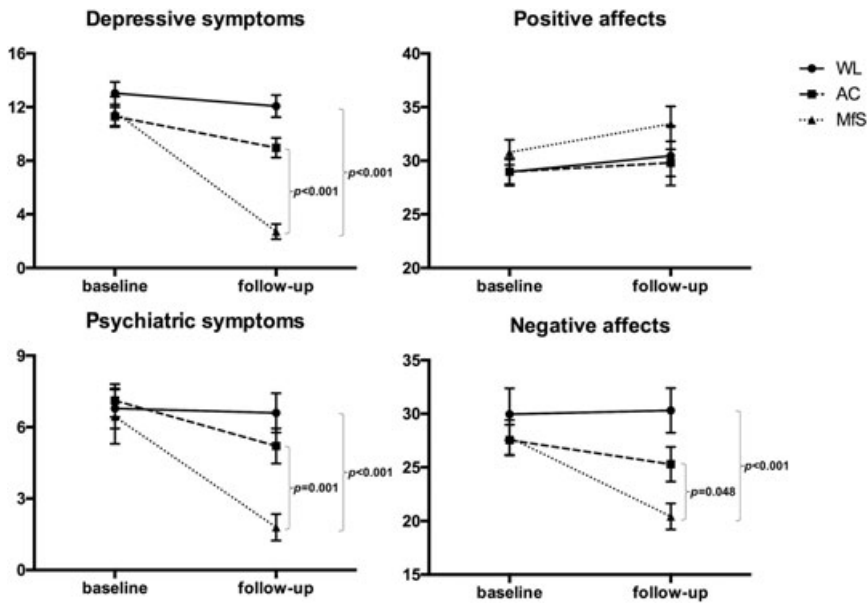
FIGURE 1 Pre and postintervention scores of depressive symptoms, psychiatric symptoms, positive affects and negative effects, with the pairwise comparison between wait list with mindfulness for stress postintervention scores and between active control scores with mindfulness for stress post-intervention scores using generalized estimating equations with Bonferroni correction. AC: active control; MfS: mindfulness for stress; WL: wait list

DS, PS, and NA presented a statistically significant decrease in MfS group when comparing the scores before and after the intervention. The levels of DS and PS also had a statistically significant decrease in the AC group, however, the MfS group presented a strong effect size in DS ($g = 0.82$) and a moderate effect size in PS ($g = 0.67$) when compared to the AC group postintervention scores, and a strong effect size in DS ($g = 0.80$) and in PS ($g = 0.82$) when compared to the WL group postintervention scores. The levels of SC, and the facets of mindfulness observe, non-judging and non-reactivity raised in the MfS group, but not in AC and WL groups, and this traits modification could be associated to the stronger reduction in DS, PS, and NA observed in MfS group.

The MfS intervention invited participants to observe events with a moment-by-moment awareness without judgment and encouraged them to be aware of reactive thoughts to these perceptions with emotions and physical sensations related to them. Using this kind of awareness, the participant can choose to continue the conversation with those thoughts or to disengage from them (using the breath as an anchor for the attention, e.g.). These practices can help in the reduction of past events rumination or in the anticipation of future ones, both sources of NA and of DS and PS (Alleva, Roelofs, Voncken, Meevissen, & Alberts, 2014; Boyle et al., 2017; Gu, Strauss, Bond, & Cavanagh, 2015).

The reduction in NA shown in the MfS group has been related to decreasing in DS and PS (Desrosiers, Vine, Klemanski, & Nolen-Hoeksema, 2013). In the MfS intervention, the participants learned that a set of immediate thoughts, emotions, and physical sensations emerges as a result of any experiences (described as primary experiences). However, that primary experience could trigger a variety of associative processes as labeling the experience, judging it, remembering something similar and its consequences, analyzing causes, and much more possible thoughts about the experience, also known as thoughts proliferation, with their corresponding emotions and physical reactions, which can be a source of significant discomfort or suffering (described as secondary experience). The cultivation of experiential acceptance, an attitude of observation without over-engagement (e.g., rumination and entanglement) and under-engagement (e.g., avoidance) to the continuous unfolding internal or external experiences, decreases secondary experiences and may, therefore, be associated with better emotion

regulation abilities, leading to better psychological adjustment to the experiences. According to Shallcross, Troy, Boland, and Mauss (2010), acceptance could be considered as an adaptive coping mechanism that buffers individuals from developing elevated levels of DS in the face of life stress.

The meditation practices and the group activities in the MfS program, since the beginning, are permeated with a self-compassionate attitude invitation. In addition, it has specific practices to develop experiential acceptance, perception, and observation of the pleasurable elements of the present experience, SC and compassion for others, and connection with other people (shared humanity). Differently from WL and AC groups, in the MfS group the scores of SC increased after the intervention, and several studies found significant inverse associations between SC and anxiety, depression, and several other negative emotions (Diedrich, Grant, Hofmann, Hiller, & Berking, 2014; Neff, 2003a; Van Dam, Sheppard, Forsyth, & Earleywine, 2011). Cultivation of SC by health professionals can support awareness of their own limitations and help deal with their reactions in a way that also allows them to be more connected to patients by their shared humanity (Gustin & Wagner, 2013).

Scores of the mindfulness facets observe nonjudging and nonreactivity were significantly higher at postintervention evaluation in MfS group comparing to baseline scores, suggesting that these skills were enhanced with the participation in MfS program. In contact with patients, awareness of thoughts, emotions and physical sensations can work both as an empathic compass that helps to better understand what they are experiencing, and as a useful resource for guiding self-care actions throughout their work as a healthcare professional. The construct of experiential acceptance includes the facets of non-judging and non-reactivity measured and may be associated with the decrease in DS, PS, and in NA seen as an outcome after participation in the MfS program. In the WL group, we identified a reduction in the score of nonreactivity at the postintervention evaluation with no other modification in SC and in others mindfulness facets. This reduction may represent a modification in the self-perception elicited by participating in the study procedures, unrelated to any of the major outcomes, for example, DS, PS, PA, and NA. Although the objective of the scale is the detection of mindfulness traits, it is possible that some state-dependent change may modify its self-assessment.

A limitation of our study is the quasi-experimental design chosen to include participants who came from the same health units in the same intervention groups. This choice was necessary to reduce the impact on healthcare delivery since the procedures were performed during the period in which the professionals would be working. The AC intervention was delivered in only four meetings to reduce the time participants were away from their professional activities, and this represents lower doses of treatment, which could have reduced the AC intervention effect. To control this effect the participants received instructions to perform the exercises in a daily base, and the AC's homework practices were discussed within the group at each meeting with the aim to stimulate its occurrences. We had a high rate of drop-out in WL group, however, there was no difference between participants that stayed in the research with those who dropped out in socio-demographic characteristics, DS, PS, PA, NA, SC, and mindfulness facets. Therefore, studies using longitudinal and randomized controlled designs comparing MfS with golden standard treatments are recommended to support the evidence described in our study, and mediation analysis is required to assess the extent to which SC and mindfulness facets mediates the beneficial outcomes in DS, PS, and NA described in the MfS intervention.

Mindfulness-based interventions could represent an important step in the field of promoting health with favorable cost-effectiveness (Knight, Bean, Wilton, & Lin, 2015) and favorable impact on depressive and psychiatric symptoms, and negative affects (Gu et al., 2015). The MfS program demonstrated significant improvement in depressive and psychiatric symptoms in our sample of healthcare professionals, as well as decreased negative affects, and is a feasible way to address professional burden and to improve well-being and compassion. Self-compassion which strongly increased in the MfS groups after the intervention but not in AC and WL groups, is associated with a reduction in psychological distress (MacBeth & Gumley, 2012), and together with the ability to be sensitive, nonjudgmental and respectful towards oneself contribute to a compassionate attitude towards others (Gustin & Wagner, 2013). This outcome is congruent with the MfS program aim of to foster a sense of compassion and equanimity in participants, bringing kindness as the main component of all meditations and practices, like the body scan, the breath awareness, and the mindful movements.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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