

ORIGINAL ARTICLE

# The effects of mindfulness-based interventions in COVID-19 times: a systematic review

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## Abstract

**Introduction:** the public health crisis caused by COVID-19, a disease caused by SARS-CoV-2, has imposed physical threats and psychological suffering on both infected patients and individuals who experience social isolation and various governmental restrictions, leading to the appearance of symptoms like anxiety, depression, as well as insomnia, stress, and changes in biological rhythm. In face of this stressful scenario, interventions based on mindfulness (MBIs) have proved to be potentially adequate tools in reducing psychological suffering and generating well-being in the general population.

**Objective:** to describe the effects of mindfulness-based interventions during the COVID-19 pandemic.

**Methods:** A systematic literature review was conducted on the effects of mindfulness intervention in times of COVID-19. The articles were searched in four databases (Pubmed, Embase, Scopus, and Science direct) and the PRISMA protocol was used to conduct this review. In total, fourteen articles were included in the study.

**Results:** the use of mindfulness techniques in the population with impaired mental health because of the COVID-19 pandemic proved to be beneficial, with improvement in emotional stress scores and reduction in anxiety symptoms, through formal mindfulness meditation practices such as mindful breathing, body scanning, and application of the mindfulness-based stress reduction strategy (MBSR). Strategies were also applied through smartphone applications that had the objective of promoting the increase of mindfulness and the development of the acceptance without judgment of the traumatic experiences already lived, in addition to an integrated intervention on the internet with the use of mindfulness, the training of respiratory relaxation, refuge skills and Butterfly Hug Method.

**Conclusion:** with the pandemic going through, still with high mortality, continuity of social isolation, and, consequently, intensification of psychic suffering in the population and health professionals, interventions based on mindfulness (MBIs) are being effective to reduce this suffering, prevent the appearance of chronic mental disorders and promote positive impacts on physical and mental well-being.

**Keywords:** mindfulness, coronavirus infections, systematic review.

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## Authors summary

### Why was this study done?

In face of the COVID-19 pandemic and the great need for mental health care in the world population, the use of mindfulness-based interventions (MBIs) in the population with mental health impairments as a consequence of COVID-19 has been beneficial, with improvement in emotional stress scores and reduction in anxiety symptoms, through formal mindfulness-type meditation practices such as mindfulness-based stress reduction (MBSR), mindfulness-based cognitive therapy (MBCT), mindfulness-based cognitive therapy for life (MBCT-L), and mindfulness-oriented meditation (MOM) have shown promise for this purpose.

### What did the researchers do and find?

A systematic review study conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines was conducted. The updated methodology used in this systematic review is in accordance with the Cochrane Handbook of Systematic Reviews of Interventions. Fourteen articles were analyzed and mindfulness techniques during the pandemic were shown to be effective for both healthcare professionals and the general population.

### What do these findings mean?

Mindfulness techniques during the pandemic have been shown to be effective for both health care professionals and the general population in promoting well-being, reducing psychological distress, improving immune function, reducing the development of post-traumatic psychopathological symptoms, and preventing the onset of chronic mental disorders. The implementation of MBIs through technological means has proven to be an effective alternative in expanding accessibility for the general population in the face of the context of social isolation.

## INTRODUCTION

COVID-19 has caused a global public health crisis of unprecedented proportions<sup>1</sup>. The infection began to spread in December 2019 and was declared a pandemic in March 2020, accounting for 118,000 cases in 114 countries to date<sup>2</sup>. Presently, the incidence and number of deaths resulting from COVID-19 have continued to increase significantly and have reached alarming numbers. According to data from the World Health Organization (WHO), in April 2021, more than 131 million cases of COVID-19 were recorded worldwide, with more than two and a half million deaths<sup>3</sup>.

This traumatic situation of rapid expansion of the virus brings physical threats and psychological suffering to both infected patients and individuals experiencing the pandemic<sup>4,5</sup>. To contain the spread of the virus and reduce the exponential increase in new cases, countries have adhered to social isolation and enacted several government restrictions. Although, the impact of confinement associated with the placement of inadequate information and lack of social interactions caused damage to the mental health of the population. During this period, many individuals started to manifest symptoms of anxiety and depression, in addition to insomnia, stress, and alterations in the biological rhythm<sup>2,6,1,4,7-9</sup>.

It is estimated that 40% to 50% of adults experience psychological distress after the COVID-19 outbreak COVID-19 and that 30% of adults and children are at risk for post-traumatic stress. Given that psychological distress developed in pandemic can cause negative changes to the mental health of individuals throughout life, interventions become necessary to promote effective psychological support. Given this stressor scenario, Mindfulness-Based Interventions (MBIs) proved potentially suitable tools in reducing psychological distress and generating welfare for the general population<sup>5,10,11</sup>.

MBIs are associated with mindfulness meditation practices, adapted from the Buddhist tradition, and inserted into contemporary programs of psychological guidance, being considered as current methods of emerging psychotherapies related to specific qualities of attention

and awareness. Mindfulness is defined as an individual to be aware in a particular way, with consciousness and purpose in current experience. It is a state of being aware and attentive to see reality with an open, tolerant, and non-judgmental experience, modifying the relationship with the experience, experiencing it as it is, with generosity and kindness<sup>5,6,10</sup>.

Mental training with MBIs is efficient to contain the development of post-traumatic psychopathological symptoms and prevent the emergence of chronic mental disorders, as well as other benefits such as increased immune function. This technique can activate the region of the anterior cingulate cortex, an area responsible for regulating autonomic and cognitive functions, such as emotion and learning. These areas are fundamental for mindfulness training due to the positive influence of this technique on mental health, memory, cognitive resilience, emotional balance, and sleep quality. Frequently, this technique enables individuals to recognize uncomfortable emotions just as sensations, increasing what we call decentering. Thus, the individual can distance himself from these states, alleviating the fear, anxiety, and stress caused by the pandemic, to promote an improvement in both physical and mental health<sup>12,13</sup>.

The techniques of this method can help patients to look at psychological experiences that cause inner distress only as passing events rather than experiences that need to be controlled or avoided, with the focus of awareness in the present moment. Faced with a scenario of social distancing, technology presents itself as an effective alternative in enabling access to the mindfulness technique for the general population. This access is an important tool to reduce the psychological, cognitive, and organizational suffering of individuals, being effective during the period of the pandemic and helping to cope with and develop positive behaviors because of the new scenario imposed by COVID-19<sup>5,6,10,13</sup>.

The aim of this article is to describe the effects of mindfulness intervention in COVID-19 times, based on the acronym PICO, which has the following correspondents,

P: study population - subjects who performed mindfulness during the COVID-19 pandemic; I: intervention - demonstrate the effects of mindfulness intervention in COVID-19 times; C: control - subjects who did not perform mindfulness-based interventions during the COVID-19 pandemic; O: outcome - subjects who underwent MBIs decreased the amount of stress, anxiety, and depression, with improved quality of life. This issue had a great impact in the last year due to the infection of the new coronavirus, as there was an increase in the number of individuals with worsening mental health during the period of social isolation due to the pandemic. Thus, this study aims to conduct a literature review on the effects of mindfulness intervention in COVID-19 times.

## METHODS

This systematic review was conducted based on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. The updated methodology used in this systematic review is in accordance with the Cochrane Handbook of Systematic Reviews of Interventions.

### Search strategy and electronic selection criteria

An information specialist searched the Cochrane Central Register of Controlled Trials (CENTRAL) in the Cochrane Library, Medical Literature Analysis and Retrieval System Online (MEDLINE Ovid), Excerpta Medica database (Embase Ovid), Science Citation Index Expanded (SCI-EXPANDED; Web of Science), Conference Proceedings Citation Index - Science (CPCI-S; Web of Science), BIOSIS (Web of Science), Scopus and Embase Database to identify relevant studies. The studies were searched in all databases from inception to April 2021. Trials were included regardless of language, publication status and publication type. For the detailed search strategies for all electronic searches, S2 Text was used.

The references retrieved by the search were screened independently, the studies were selected and had their data extracted using a predefined data extraction spreadsheet including the following data: Methods: first author or acronym, year of publication and study design. Participants: sample size, disease severity and setting. Interventions: duration of interventions and follow-up. Outcomes: adverse events and serious adverse events. Additional outcomes: patients on treatment and duration of treatment.

Any uncertainty regarding study eligibility and data extraction was discussed until consensus was reached; conflicts of opinion were resolved with other members of the review team. The risk of bias of included studies was assessed with the Cochrane tool. The Grading of Recommendations Evaluation, Development and Assessment (GRADE) approach was used, using the Confidence in Network Meta-Analysis Software. The GRADE approach was used, evaluating each network estimate according to the following criteria: study

limitation, indirectness, inconsistency, imprecision and publication bias. The overall judgment of the certainty of the evidence was reached by considering the domains as a whole and downgraded the evidence by one if a domain was classified as “some concerns” and by two if a domain was classified as “major concerns.” Finally, each comparison was assigned an overall qualitative judgment based on four levels of certainty of evidence: high, moderate, low and very low.

### Data Synthesis

The certainty of the evidence was extracted according to the GRADE approach. The GRADE approach was also used to present the summary of evidence findings. Narrative synthesis was the best choice to summarize the systematic inference on various results of the included studies. Data were also described in tabular format.

### Data Extraction and Management

Titles and abstracts were selected, articles published in full text were retrieved and data were extracted based on the PICO algorithm. Thus, data on population/patients, interventions/indicators, comparators, outcomes and period/study type were extracted from the included articles.

Assessment of the risk of bias of the studies included: two independent reviewers critically evaluated the articles using a standard method for evaluating systematic reviews. Adhering to the GRADE approach, valid evidence was screened among the articles retrieved from different databases. The agreement rate in critically evaluating the articles was 94% ( $p < 0.005$ ), and disagreements were resolved by consensus. The systematic reviews of clinical trials were critically evaluated based on the method evaluation in the Cochrane Handbook for Systematic Reviews of Interventions and the GRADE guideline.

Types of interventions: mindfulness in the population exposed by COVID-19, including psychiatric interventions.

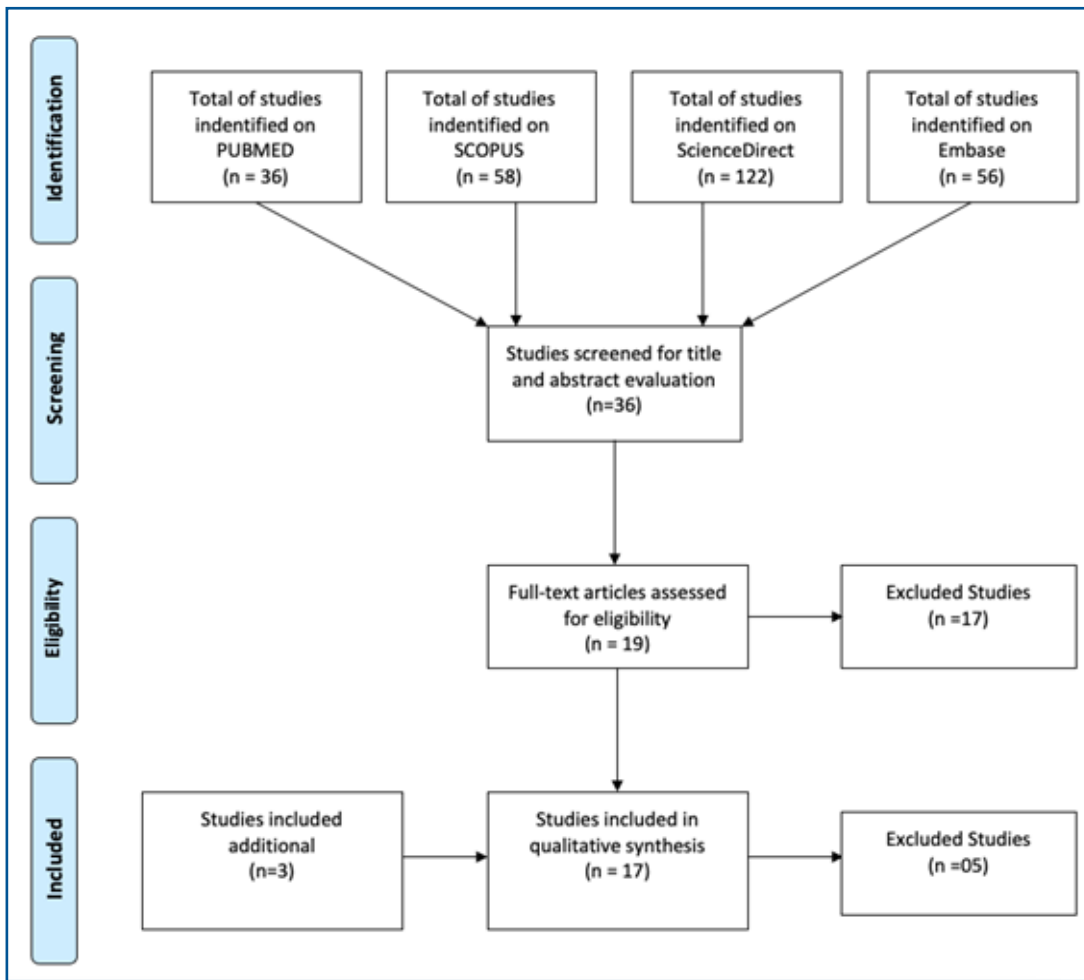
Types of outcomes: The outcome of interest was the effectiveness of interventions in mindfulness-based interventions.

### Inclusion and exclusion criteria

The inclusion criteria for this study were: a) articles that were related to the proposed theme; b) original articles: prospective or retrospective observational studies (analytical or descriptive, except case report), experimental or quasi-experimental. Exclusion criteria were a) other study designs, such as case reports, case series, literature review; b) comments, editorials, readings, and letters c) articles not related to the topic.

## RESULTS

Of 272 references screened, 36 were accepted for reading of the title and abstract. 19 articles were read in full, leaving a total of 14 articles that were included in the analysis. (figure 1).



**Figure 1:** PRISMA Flowchart

A total of 272 articles were found. Five independent researchers evaluated the titles and abstracts of the articles, 36 studies were pre-selected for potential eligibility. The characteristics of all included studies are presented in table 1. Most of the studies were retrospective. Seven studies reported multicenter data, while the remainder reported single-center data. The definition of severe COVID-19

was heterogeneous across all included studies. The most common definition of mindfulness was based on clinical criteria (n = 14). All studies were published as a complete manuscript. Overall, fourteen studies were of high quality, while the others were of medium quality. In addition, three studies were included because they were considered relevant to the article<sup>3,8,9</sup>.

**Table 1:** Characteristics of included studies

Author / (Year)	Study type	Sample	Main findings
Wielgus et. al. <sup>1</sup> , (2020)	Cross-sectional study	The sample contained 170 people. The average age of participants was 27 years. Participants were recruited on the Facebook platform. The State-Trait Anxiety Inventory (STAI) was used.	The results revealed that mindfulness had a direct impact and decreased the level of anxiety (b = -0.22, p = 0.002). Mindfulness can mediate the development of mental disorders and facilitate the achievement of general well-being. The study points to the usefulness of the practice of mindfulness as a form of self-help with anxiety symptoms. There was a significant positive association between psychosomatic functioning and mindfulness (r (168) = 0.502, p <0.001).

**Continuation - Table 1:** Characteristics of included studies

<b>Author / (Year)</b>	<b>Study type</b>	<b>Sample</b>	<b>Main findings</b>
Jiménez et. al. <sup>2</sup> (2020)	Cross-sectional study	The study was conducted with 412 participants who completed an online form, in which sociodemographic data, quality of cohabitation during the pandemic, cohabitation with a case of COVID-19 were collected, practice of some meditation, among other variables. Mental health was assessed using the Depression, Anxiety and Stress Scale-21 (DASS-21), Event Impact Scale (IES) and Self-Compassion Scale Short Form (SCS-SF), which includes mindfulness as a subscale.	Mindfulness was related to better cohabitation during confinement ( $F(3, 403) = 11.83, p \leq 0.001, d = 1.05$ ). Mindfulness scores were higher in older age groups, in participants who were not undergoing any type of treatment, and in groups who practiced meditation. By type of occupation, the unemployed scored less.
Wei et. al. <sup>4</sup> (2020)	Randomized Controlled Trial	2-week study conducted at First Affiliated Hospital, School of Medicine, Zhejiang University (Hangzhou, China) in February 2020. A total of 26 patients with COVID-19 were included in this study. After recruitment, participants were randomly assigned to groups sequentially, with equal probability of receiving an integrated Internet-based intervention through cognitive behavioral therapy (intervention group) or supportive care alone (control group), with 13 participants in each group. The integrated Internet-based intervention is a self-help intervention containing four main components: mindfulness, (body scan), breathing relaxation training, “refuge” skills and the “butterfly hug” method.	Patients in the intervention group exhibited significantly reduced levels of depression and anxiety symptoms compared with those in the control group, indicating that the integrated Internet-based intervention showed a rapid improvement in mood disturbance and should be applied in the treatment of psychological distress. in patients with COVID-19.

**Continuation - Table 1:** Characteristics of included studies

<b>Author / (Year)</b>	<b>Study type</b>	<b>Sample</b>	<b>Main findings</b>
Matiz et. al. <sup>5</sup> (2020)	Randomized Controlled Trial	A sample of Italian teachers (n = 66, age: 51.5 ± 7.9 years) was assessed with self-report instruments one month before and one month after the onset of the lockdown caused by the COVID-19 pandemic. Meanwhile, they received an 8-week Mindfulness-Oriented Meditation (MOM) course. Analyzes of variance were performed in a low resilience (LR, n = 32) and high resilience (HR, n = 26) group. 8 teachers did not complete. The final sample consisted of 58 teachers.	MBIs can effectively help with the negative psychological consequences of the Covid-19 outbreak, restoring well-being to the most vulnerable individuals. Significant improvements in mindfulness skills, affective empathy, harm avoidance, character traits (especially in the participants of the low resilience group), as well as in psychological well-being (on the scales of autonomy, environmental mastery, and positive relationships with others), anxiety, depression (especially in the low resilience group), and emotional exhaustion were observed in most self-reports of both groups. The positive results in this study have a direct relationship between the amount of meditation practice and the extent of beneficial outcomes from MBIs.
Baiano et. al. <sup>6</sup> (2020)	Randomized Controlled Trial	25 participants were submitted to three self-report questionnaires that assessed concern by the Penn State Worry Questionnaire, (PSWQ), anxiety by the Anxiety Sensitivity Index (ASI-3) and trait mindfulness by the Mindful Attention Awareness Scale (MAAS) at T0 (before lockdown) and at T1 (at the end of lockdown).	At T1 the mindfulness trait was inversely related to worry and fear of mental health, as higher levels of mindfulness trait were related to lower levels of psychological uncontrollable worry and anxiety. This result may suggest the mindfulness trait, which is one of the goals of mindfulness meditation. These techniques could have protected people from maladaptive concerns during the COVID-19 lockdown.
Yuan et. al. <sup>7</sup> (2021)	Cohort Study	Data collected in a high school. The Connor-Davidson Resilience Scale (CD-RISC) was applied to all students (n=1558). Of these, 90 students with low levels of resilience were recruited to participate in the mindfulness training group experiment, another 90 were randomly selected for the control group. The research lasted 6 months and participants were instructed to listen to a 15-minute recording of mindfulness training.	Mindfulness training (MT) increased the resilience and emotional intelligence of the students in the experimental group and information was seen about the active areas of the brain, in which the basal ganglia, entorhinal cortex and medial prefrontal cortex are the important brain regions that serve the meditative state, these three are crucial for the cognitive and emotional processes relevant to mindfulness training. Individual resilience tends to grow, and the speed of this development gradually increases. Thus, MBIs lead to a significant improvement in resilience and emotional intelligence.

Continuation - Table 1: Characteristics of included studies

Author / (Year)	Study type	Sample	Main findings
Sweeny et. al. <sup>10</sup> (2020)	Cross-sectional study	Citizens of Wuhan and other major cities affected by COVID-19 (N = 5115) were recruited between February 12 and 19, 2020. An online survey was launched evaluating subjective experiences of flow, mindfulness, and well-being. The online survey was hosted at IQEQ (Intelligence Quotient and Emotional Quotient), developed by one of the co-authors (R.Z.) at Nanjin University. The recruitment of participants was directed to university students via social media (WeChat platform).	Mindfulness was associated with better well-being during the stressful circumstances in which people found themselves in China in February 2020, independently of quarantine status or duration.
Malboeuf-Hurtubis et. al. <sup>11</sup> (2021)	Randomized cluster trial	Five classrooms of elementary school students (N = 37; mean age = 8.18 years, 57% boys and 43% girls) from two different schools in Quebec, Canada. Students completed pre-intervention measurements one week before the start of the intervention and post-intervention measurements one week after the end of the intervention.	Participants who received the mindfulness intervention showed an increase in satisfaction both pre-intervention (Mpre = 10.43) and post-intervention (Mpost = 11.64). Students after mindfulness interventions developed an increased ability to observe and describe their experiences, emotions, or behaviors. Therefore, it can be concluded that the intervention was effective in increasing the trait of mindfulness.
Conversano et. al. <sup>12</sup> (2020)	Cross-sectional study	An online survey was launched on March 13, 2020, in which 6412 responses were collected from middle-aged adults, between 30 and 50 years old, living in Italy. The following were used to assess psychological distress: Symptom Checklist-90 and Mindfulness Awareness Scale.	With the use of mindfulness techniques there was a better response, also acting as a protective factor, in symptoms of anxiety, dysphoric mood, lack of motivation, loss of vital energy, feelings of hopelessness and cognitive and somatic correlates of depression, representing an effective intervention to minimize the onset of post-traumatic symptoms and prevent the onset of chronic mental disorders.
Liu et. al. <sup>13</sup> (2020)	Randomized Controlled Trial	408 medical staff in China signed up for the audio album that taught mindfulness in a period of 8 to 10 minutes a day.	It has been observed that mindfulness exercises can activate the anterior cingulate cortex of the brain, playing an important role in focusing attention, stimulating, maintaining motivation, and changing activities in the emotion-related area of the brain, capable of enhancing the experience of positive emotion in the individual. The MBIs were effective in achieving relaxation and mental rehabilitation, so it could be a good method to adapt to complex periods.

**Continuation - Table 1:** Characteristics of included studies

<b>Author / (Year)</b>	<b>Study type</b>	<b>Sample</b>	<b>Main findings</b>
Strauss et. al. <sup>14</sup> (2021)	Randomized Controlled Trial.	Health professionals at one of four NHS organizations in the south of England were randomly assigned (1:1) to receive Mindfulness-Based Cognitive Therapy for Life (MBCT-L) or to wait list. The weekly session lasts two hours and participants were asked to complete approximately 40 minutes per day of mindfulness practice and other household tasks.	The primary outcome was self-reported post-intervention stress. Secondary outcomes were well-being, depression, anxiety, and work-related outcomes. MBCT-L can improve stress, anxiety, and depression in healthcare professionals, improve well-being, mindfulness and self-compassion, and is acceptable and engaging. The findings suggest that MBCT-L provides an effective, acceptable, and affordable way to reduce stress and improve their well-being.
Pizarro-Ruiz et. al. <sup>15</sup> (2021)	Randomized Controlled Trial	164 Spanish were distributed in two groups: control group and experimental group, which were evaluated before and after the intervention. The same was done through a smartphone app called "Fresh Air" for 14 days in the quarantine produced by the Covid-19 pandemic.	The intervention showed an increase in general levels of mindfulness trait and in most of its dimensions, forgiveness in general and self-forgiveness, as well as levels of satisfaction with life. In addition, it showed a decrease in the participants' negative affect and influenced the increasing levels obtained in intellectual and interpersonal strengths. Therefore, the study considers the use of short mindfulness interventions to promote improved occupational and employee health.
Cunningham et. al. <sup>16</sup> (2021)	Randomized Controlled Trial	Ten daylong resilience retreats were delivered to independent groups of nurses, nurse practitioners, and other health professionals. Pre- and post-treatment assessments were completed using a 19-item survey to assess anxiety, intention to engage in mindfulness practices, and self-efficacy around mindfulness.	The study shows a significant reduction in anxiety scores and markers of physiological and psychological stress after mindfulness, as well as greater interest by participants in maintaining mindfulness practices. Thus, it is postulated that mindfulness practices are valuable, feasible, and potentially cost-effective interventions that can provide opportunities for health care professionals to practice mindfulness and can reach a wider audience when conducted virtually in times of pandemic.
Lian et. al. <sup>17</sup> (2021)	Cross-sectional study.	The study was carried out from January 2020 to March 2020 with 301 health professionals (surgeons, nurses, and anesthesiologists). The degree of anxiety and stress in the operating room regarding possible exposure to the new coronavirus was evaluated through the following scales: self-assessment anxiety scale (SAS) and pressure perception scale (PSS-14).	The results showed that on average 80% of participants were concerned about a possible infection by the new coronavirus due to exposure to smoke from surgical instruments, contact with blood and acute injury from contaminated instruments, showing a clear degree of psychological pressure ( $P < 0.05$ ). Mindfulness-based stress reduction therapy (MBSR) with formal mindfulness techniques such as conscious breathing and body scanning has presented itself as a solution to reduce stress and ensure good physical and mental health for health care workers.



## DISCUSSION

The social isolation imposed by state authorities has been the main measure to contain the proliferation of SARS-CoV-2. This behavior has reduced social interactions and has intensified feelings of fear, boredom, and stress in the general population, in addition to promoting psychological changes with the manifestation of depressive and anxiety symptoms<sup>1,4,5</sup>. Given this scenario, several researchers reported the need to provide psychological support to people affected by the pandemic to minimize the damage caused to the mental health of individuals. In some studies, MBIs such as mindfulness-based stress reduction (MBSR), mindfulness-based cognitive therapy (MBCT), mindfulness-based cognitive therapy for life (MBCT-L), and mindfulness-oriented meditation (MOM) has shown promise for this objective<sup>1,5,13,14</sup>.

The MBIs have shown benefits, as they can positively influence mental health if practiced properly and continuously. Although, individuals with low mindfulness are more vulnerable to presenting irresistible but unwanted thoughts and actions<sup>12</sup>. Mindfulness training can alter brain activity related to emotions and improve mental health development. In addition to activating the anterior cingulate cortex, we analyzed, through a meta-analysis, important areas of the brain that are responsible for cognitive and emotional processes relevant to mindfulness intervention: the basal ganglia, which can inhibit irrelevant thoughts, the entorhinal cortex which acts to control the mental state and the medial prefrontal cortex which contributes to an enhanced sense of emotional self-awareness. Thus, these regions are important for the meditation experience and fundamental for mindfulness exercises<sup>7,13</sup>.

In a study where a group of teachers underwent the practice of mindfulness-oriented meditation (MOM) during a period before the pandemic and after the lockdown resulting from COVID-19, the practices lasted 8 weeks and were carried out online, facilitating the participants' access to the proper execution of the technique. The individuals evaluated showed an improvement in the emotional stress score, in addition to a reduction in anxiety symptoms that either emerged or were intensified by the confinement context of the pandemic. However, the study concluded that for greater effectiveness of MOM, the practice of the method should be continuous, a conclusion that is consistent with another study who concluded that the effects performed by the mindfulness technique on the mental health of individuals are acquired with the frequent practice of activities. Furthermore, resilience was highlighted as an important feeling, considering the positive influence that the feeling exerts on the development of mindfulness and psychological well-being<sup>1,5</sup>.

One of the most common psychological symptoms during confinement is anxiety, which is characterized by a state of tension, agitation, or apprehension that increases the activity of the sympathetic autonomic nervous system. In this context, one study observed that participants who were already worried before the pandemic, identified through the anxiety sensitivity index scale-3 (ASI-3), had an even higher score on the ASI-3 scale during the pandemic. These participants also showed signs of cognitive loss, identified through reports such as: "I worry that I may

be losing my mind", thus corroborating diagnoses of generalized anxiety disorder and panic disorder. Given this, MBIs, such as mindfulness-based stress reduction and mindfulness-based cognitive therapy, are techniques that can reduce anxiety symptoms through activation of the parasympathetic autonomic nervous system, given their actions in improving the ability to focus attention, stress reduction and awareness in the present moment<sup>1,6</sup>.

Given this current scenario of isolation and reduced interpersonal contact, access to psychologists or psychiatrists has become even more difficult, requiring the implementation of interventions that make reaching these professionals more accessible<sup>1</sup>. The internet has proven to be a promising way to do this through smartphone applications that aim to promote increased mindfulness and the development of non-judgmental acceptance of traumatic experiences already lived, promoting greater well-being. Online therapy is being well accepted as it has advantages such as easy access, independence of time and place, lower costs, and flexibility. In addition, it can prevent contact and thus transmission of SARS-CoV-2, reducing the risk of infection for both patients and mental health professionals<sup>10,13</sup>.

One of the alternatives found in the face of social isolation was the association between mindfulness and technology. One of the studies shows cognitive behavioral therapy through an Integrated Internet Intervention that is comprised of four self-help components: mindfulness (body scanning), respiratory relaxation training, refuge skills, and the butterfly hug method. These techniques are applied online by therapists to help patients work through their traumatic memories. To assess symptoms of depression and anxiety in research patients, the 17-item Hamilton Depression Scale (17-HAMD) and the Hamilton Anxiety Scale (HAMA) were used. Patients who used these four components, who were instructed through audios with daily durations of 50 minutes for 2 weeks, had reduced levels of depression and anxiety symptoms according to the scales used when compared to the control group. This indicates that this intervention is effective in improving mood disorders and should be used to treat psychological symptoms in patients with COVID-19<sup>4</sup>.

Moreover, the effectiveness of an audio application for MBSR has been demonstrated, which features basic mindfulness exercises, such as mindful breathing, various meditations, body scanning, training of the five senses, among others, with at least 13 sessions lasting eight to ten minutes. Mindfulness-based stress reduction has been widely used in recent years in patients with post-traumatic disorder, as it can promote mindful meditation associated with training to relieve individual stress and regulate emotions. In this study, the target audience was the health teams who reported that the daily audios were able to help them in the process of relaxation and reduction of stress peaks, thus demonstrating the effectiveness of the applications for frontline professionals during this troubled period of the pandemic<sup>13</sup>.

Another study with technological experience was carried out, for 14 days, with the Spanish application "Aire Fresco" (Fresh Air), which allows guided mindfulness meditation practices for Spanish university students from

social education and nursing courses. An increase was found in the general levels of the mindfulness trait and in most of its dimensions, such as observing, describing, and acting with awareness and without judgment, observed through the Five Facet Mindfulness Questionnaire (FFMQ). In addition, using this application, significant improvements were observed in the levels of satisfaction with life, in intellectual and interpersonal strength in general, and self-forgiveness, with a simultaneous reduction in negative affect, as evidenced by the life satisfaction scale, brief strength scale, heartland forgiveness scale, positive and negative affect scale, respectively<sup>15</sup>. Thus, it was noticed that online exercises work effectively, and these interventions can help in the treatment of psychological suffering in this period of uncertainty experienced with COVID-19<sup>4</sup>.

Other research has looked at the psychological effects in quarantine-like circumstances during other viral outbreaks such as Ebola and Influenza. Symptoms of anguish were observed, such as fear of becoming infected and transmitting it to people with whom one lives, feelings of frustration and boredom. In situations of long isolation, health professionals present greater symptoms of post-traumatic stress disorder and greater emotional exhaustion<sup>10</sup>. An intervention carried out with head nurses aimed to promote health, well-being and reduce the symptoms of anxiety of these professionals through the realization of ten sessions with daily mindfulness practices. This intervention promoted a reduction in psychological stress markers, observed through an inventory and a questionnaire developed by the research team. The results demonstrated the effectiveness of the method in reducing the exhaustion of health professionals, in addition to significantly reducing anxiety symptoms and motivating professionals to continue the practice of mindfulness<sup>16</sup>.

Meanwhile, in a survey carried out in Harbin, China, to investigate the psychological state of occupational exposure of surgeons, nurses, and anesthesiologists working in the operating room, it was found from the self-assessment scale (SAS) and pressure perception scale (PSS- 14) that the medical team was under anxiety and stress-related issues mainly to possible contamination with the new coronavirus due to exposure to smoke from surgical instruments, contact with blood from patients and acute injury by contaminated instruments. The mental health problem of these professionals should not be underestimated, considering that the COVID-19 pandemic

is a sudden traumatic event, both for the general population and the medical team. Thus, the techniques of MBIs, such as breathing awareness and body scanning, a solution to reduce stress and ensure good physical and mental health for health professionals<sup>13,17</sup>.

Furthermore, it was observed in a study carried out before the pandemic that the MBCT-L, developed for people with a history of recurrent depression at risk of depressive relapse, is an effective way to reduce stress and poor mental health, and can be performed in health professionals who are exposed to the new coronavirus. The research was carried out with 15 professionals, over a period of eight weeks, in which each weekly session lasted two hours and it was up to the participant to choose the practice of mindfulness for forty minutes a day. They learned to stabilize attention, regulate their emotions and behavior, in addition to improving self-care and transferring this learning to their professional and personal life<sup>14</sup>. The practice of mindfulness can help individuals to transfer attention from traumatic memories to the current experience, promoting the reduction of psychological suffering and contributing positively to the fight against the pandemic<sup>5,6,10,13</sup>.

Finally, there is a need to develop projects involving mindfulness practices to alleviate the burden imposed on health professionals and the population during the COVID-19 pandemic. It must be considered that health professionals play a critical role in the health of a nation, but these professionals' stress rates are disproportionately high, requiring strategies such as MBIs<sup>14</sup>.

## ■ CONCLUSION

The MBIs during the pandemic has been shown to be effective for both health professionals and the general population in generating well-being, reducing psychological distress, and improving immune function, in addition to reducing the development of post-traumatic psychopathological symptoms and prevent the onset of chronic mental disorders. Furthermore, the implementation of MBIs through technological means proved to be an effective alternative in expanding accessibility for the population in general in the context of social isolation.

The practice of mindfulness can reduce symptoms of anxiety, depression, and stress both in the general population and in health professionals, thus promoting positive impacts on the quality of life of these individuals.

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## Resumo

**Introdução:** a crise de saúde pública ocasionada pela COVID-19, doença causada pelo SARS-CoV-2, impôs ameaças físicas e sofrimento psíquico tanto aos pacientes infectados quanto aos indivíduos que vivenciam o isolamento social e as diversas restrições governamentais, propiciando o aparecimento de sintomas de ansiedade, depressão, além de insônia, estresse e alterações do ritmo biológico. Diante desse cenário estressor, as intervenções baseadas em atenção plena (MBIs), se mostraram ferramentas potencialmente adequadas na redução do sofrimento psicológico e na geração de bem-estar da população em geral.

**Objetivo:** descrever os efeitos das intervenções baseadas em mindfulness em tempos da COVID-19.

**Método:** foi realizada uma revisão sistemática da literatura sobre os efeitos da intervenção mindfulness em tempos da COVID-19. Os artigos foram pesquisados em quatro bases de dados (Pubmed, Embase, Scopus e Science direct) e o protocolo PRISMA foi utilizado para realização desta revisão. No total, quatorze artigos foram incluídos no estudo.

**Resultados:** a utilização de técnicas de mindfulness na população com prejuízos na saúde mental em consequência da pandemia da COVID-19 mostraram-se benéficas, ocorrendo melhora no escore de estresse emocional e redução dos sintomas de ansiedade, através de práticas formais de meditação tipo mindfulness, como respiração consciente, escaneamento corporal, e aplicação da estratégia de redução do estresse baseada em atenção plena (MBSR). Estratégias também foram aplicadas através de aplicativos de smartphone que tiveram o objetivo de promover o aumento da atenção plena e o desenvolvimento da aceitação, sem julgamentos, das experiências traumáticas já vividas, além de intervenção integrada na internet com o uso da atenção plena, treinamento de relaxamento respiratório, habilidades de refúgio e método do abraço de borboleta.

**Conclusão:** com o perpassar da pandemia, ainda com elevada mortalidade, continuidade dos isolamentos sociais, e, conseqüentemente, intensificação do sofrimento psíquico na população e profissionais de saúde, as intervenções baseadas em atenção plena (MBIs) estão sendo eficazes para diminuir esse sofrimento, prevenir aparecimento de transtornos mentais crônicos e promover impactos positivos no bem-estar físico e mental.

**Palavras-chave:** mindfulness, coronavirus infections, revisão sistemática

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