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Feasibility evaluation of a mindfulness-based stress reduction program for primary care professionals in Brazilian national health system

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ABSTRACT

Background and purpose: In the last decades, an increasing body of scientific studies has shown mindfulness-based interventions as efficacious for reducing stress, including among primary care professionals. Despite the strength of the evidence, mindfulness-based interventions still are not widely adopted as a clinical practice in national health systems. The aim of the present study was to conduct a feasibility evaluation of a mindfulness-based stress reduction program for primary care professionals in Brazilian national health system.

Materials and methods: A pilot mindfulness program was conducted through the course of four weekly encounters in the municipality of Biguaçu with the participation of 26 primary care professionals. Data was collected through direct observations and four self-report questionnaires. The information was used to complete an evaluation matrix and reach a value judgment about the feasibility level of the components of the mindfulness-based program.

Results: The subdimensions Integration, Demand, and Acceptability were judged as "Highly Feasible", the subdimension Practicality was judged as "Feasible" and the subdimension Adaptation was judged as "Lowly Feasible". The results indicated that there is a high demand for stress-reduction interventions within the context of primary care and the acceptability by the stakeholders (participants and management) was excellent. However, the two main barriers found were the need for a brief version of the program to accommodate the restrictive timetable of the primary care professionals and the low retention rates.

Conclusion: The implementation of a mindfulness-based program for primary care professionals in Brazilian national health system was judged as "Feasible". Further studies need to conduct the feasibility evaluation in other municipalities and with larger sample sizes to ensure the generalizability of these results.

1. Introduction

Healthcare professionals, due to the nature of their job, deal with suffering, pain, and death of patients on a daily basis. The constant exposure to suffering and disease makes healthcare professionals one of the professional categories that are most vulnerable and affected by stress [1]. In addition, healthcare professionals who work in the level of primary care have to deal with additional sources of stress present in this context, such as cuts in governmental funding and lack of resources and materials [2].

A growing body of research evidence in the last decades has shown that mindfulness-based interventions are efficacious for reducing stress, with several studies being conducted with healthcare professionals [3,4] and a few specifically with primary care professionals [5–8]. In the first study about the effectiveness of a mindfulness-based intervention targeted for primary care professionals, all primary care physicians in the Greater Rocherster, New York (n = 871) were invited to participate in an 8 weekly 2.5-h sessions mindfulness intervention [5]. Of the 70 physicians enrolled, the before-and-after study showed that the intervention was effective in reducing burnout and increasing personal well-being. The subsequent studies expanded to include not only physicians but also other primary care professionals (e.g. nurses, psychologists) [6–8]. Asuero et al. [7] conducted a pragmatic randomized controlled trial ($n_{intervention}$ = 43, $n_{control}$ = 25) of an 8 weekly 2.5-h sessions mindfulness intervention and found the intervention to moderately decrease burnout and to reduce mood disturbance. Positive

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Table 1
Evaluation matrix of the feasibility of a mindfulness-based program for primary care professionals in Brazilian national health system.

Indicator		Measure	Parameter	Feasibility level
Dimension organizational context				
Subdimension practicality				
Adequate space for the program activities		Availability of physical space, with the requisite features: adequate size to fit program's participants and exclusivity of the utilization of the space during the interventions	YES - > Highly feasible NO - > Unfeasible	Result = YES **Highly feasible** (3 points)
Adequate material for the program activities		Availability of a projector. Availability of chairs to all participants. Availability of meditation cushions to all participants.	NO NO NO - > Unfeasible YES NO NO - > Unfeasible NO NO YES - > Feasible NO YES NO - > Feasible YES YES NO - > Feasible YES NO YES - > Feasible YES YES YES - > Highly Feasible	Result = YES YES NO **Feasible** (2 points)
Subdimension adaptation				
Program extension	Manager acceptance of the program regarding numbers of sessions and number of hours.	8 weeks intervention with 2 + hours - > Highly feasible 4 weeks intervention with 2 + hours - > Feasible 8 weeks intervention with at least 1 h - > Feasible 4 weeks intervention with at least 1 h - > Lowly Feasible The program can't be executed - > Unfeasible	Result = 4 weeks intervention with at least 1 h **Lowly feasible** (1 point)	
Existence of a qualified professional to conduct the program	Identify the existence of an instructor with the required professional qualifications to conduct mindfulness programs. Identify the existence of an instructor with the recommended years of mindfulness meditation practice.	At least five years of mindfulness meditation practice[a] - > Highly qualified (3 pt) At least three years of mindfulness meditation practice - > Qualified (2 pt) Mindfulness meditation practice of fewer than three years - > Not qualified (0 pt) Have the professional formation[b] and did take a specific course for mindfulness instructors - > Highly qualified (3 pt) Have the professional formation but didn't take a specific course for mindfulness instructors - > Qualified (2 pt) Doesn't have the professional formation but took a specific course for mindfulness instructors - > Qualified (2 pt) Doesn't have the professional formation and didn't take a specific course for mindfulness instructors - > Not qualified (0 pt) Σ Scores Value of 6 - > Highly feasible Values of 5 and 4 - > Feasible Value of 3 - > Lowly feasible Value less than 3 - > Unfeasible	Result = 4 points At least three years of mindfulness meditation practice (2 points) Have the professional formation but didn't take a specific course for mindfulness instructor (2 points) Feasible (2 points)	
Subdimension: integration				
Existence of other workers' health programs or interventions	Existence of other interventions aimed at promoting workers' health in the last 3 years	4 or more interventions - > Highly Feasible 2 to 3 interventions - > Feasible 1 or no intervention - > Lowly Feasible	Result = 2 to 3 interventions **Feasible** (2 points)	
Availability of time during working hours to participate in the intervention	The possibility to execute the program during working hours.	Executed during working hours - > Highly feasible Executed outside of working hours - > Unfeasible	Result = Executed during working hours **Highly feasible** (3 points)	
Availability of strategies to cover the professional in his absence		Existence of other professionals covering the tasks - > Highly feasible	Result = Existence of other professionals covering the tasks	

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Table 1 (*continued*)

Indicator		Measure	Parameter	Feasibility level
		Dimension organizational context		
		Subdimension practicality		
	The existence of other professionals covering the participant of the program by doing his tasks while he is absent.	Inexistence of other professionals covering the tasks - > Lowly feasible	**Highly feasible** (3 points)	
		Dimension stakeholders perspective		
		Subdimension demand		
Perception of stress	Self-perceived stress in work environment. Perception of other professionals stresses in work environment.	Self-perceived stress (5 pt) Stress perceived in others (5 pt) Absence of self-perceived stress (0 pt) Absence of the perception of stress in others (0 pt) Average of the sum of the scores of each professional: > 4 points - > Highly feasible 3,9 to 2 points - > Feasible 1,9 to 1 point - > Lowly feasible < 1 point - Unfeasible	Result = 6.73 **Highly feasible** (3 points)	
Perception of the need for a stress reduction intervention	Perception of the need and importance of an intervention to reduce stress on himself Perception of the need and importance of an intervention to reduce stress on work colleagues	Perception of the need for a stress reduction intervention for himself (5 pt) Perception of the need for a stress reduction intervention for work colleagues (5 pt) Absence of the perception of the need for a stress reduction intervention for himself (0 pt) Absence of the perception of the need for a stress reduction intervention for work colleagues (0 pt) Average of the sum of the scores of each professional:: > 4 points - > Highly feasible 3,9 to 2 points - > Feasible 1,9 to 1 point - > Lowly feasible < 1 point - Unfeasible	Result = 9.42 **Highly feasible** (3 points)	
		Subdimension acceptability		
Previous manager knowledge of mindfulness meditation	Existence of knowledge by the manager about what is mindfulness meditation Existence of knowledge by the manager about the scientific evidence that gives support to mindfulness meditation	YES YES - > Highly feasible YES NO - > Feasible NO NO - > Feasible	Result = NO NO **Feasible** (2 points)	
Adherence of the professionals to the program	Percentage of professionals which initiated the program in relation to all professionals invited	> 75% - > Highly feasible 50% a 75% - > Feasible 0% a 50% - > Lowly feasible	Result = 76% **Highly feasible** (6 points)	
Retention of the professionals in the program	Percentage of professionals which took at least 3 program session in relation to the number of professionals which initiated the program	100% a 83% - > Highly feasible 83% a 75% - > Feasible 75% a 50% - > Lowly Feasible < 50% - > Unfeasible	Result = 64% **Lowly feasible** (2 points)	
Recommendation of the mindfulness meditation program to colleagues	Percentage of professionals which would recommend the mindfulness-based stress reduction program to other professionals	> 75% - > Highly feasible 50% a 75% - > Feasible 25% a 50% - > Lowly feasible < 25% - > Unfeasible	Result = 100% **Highly feasible** (6 points)	
Perception of work overload due to the intervention	Percentage of professionals which perceive work overload after their participation in the program	> 75% - > Unfeasible 50% a 75% - > Lowly feasible	Result = 07% **Highly feasible** (6 points)	

(*continued on next page*)

Table 1 (*continued*)

Indicator	Measure	Parameter	Feasibility level
Dimension organizational context			
Subdimension practicality			
Perception of the program as effective to reduce organizational stress	Percentage of professionals which perceive the mindfulness-based program as effective in reducing stress 25% a 50% - > Feasible < 25% - > Highly feasible > 75% - > Highly feasible 50% a 75% - > Feasible 25% a 50% - > Lowly feasible < 25% - > Unfeasible	Result = 100% **Highly feasible** (6 points)	

[a] By mindfulness meditation practice it is established by this research the regularity of at least two formal practices in the week, as well as everyday informal practice in life situations.
[b] Mental health professional, health care professional, educator or social assistant.

results in reducing stress and burnout among primary care professionals were also reported for a brief mindfulness intervention [6]. In Fortney et al. [6] study, an abbreviated mindfulness intervention occurred from Friday to Sunday and had two 2-hour follow-up sessions. The abbreviated version was chosen since a previous application of the standard 8-week Mindfulness-Based Stress Reduction (MBSR) program to healthcare professionals had a 44% attrition rate, with participants reporting dropping out due to 'lack of time' [9]. The results showed that a modified mindfulness intervention is time-efficient and might as well constitute a tool to promote primary care professionals' well-being [6].

Although the literature about the efficacy of mindfulness programs is extensive, only recently researchers are starting to investigate the feasibility of mindfulness-based interventions in different healthcare scenarios [10]. Concerns about feasibility are of genuine importance for managers and stakeholders. Even if an intervention has been shown as efficacious by clinical trials, the intervention will not become a regular clinical practice if there are significant barriers to its implementation in a real-world healthcare setting [11]. The feasibility evaluation of an intervention aims to identify if the intervention can be executed; and, otherwise, which modifications are required in the program or in the organizational context before its implementation [12]. A theoretical framework for the feasibility of a mindfulness-based intervention for primary care professionals and an evaluation matrix have been recently proposed [13]. Santiago et al. [13] conceptualized the feasibility of a mindfulness-based intervention for primary care professionals through five subdimensions: Practicality, the extent to which a program can be implemented and executed using the available resources; Adaptation, required modifications in the program content so it becomes adequate to a new organizational context; Integration, required modifications in the health care system so it can integrate the program; Demand, the interest in the program by the stakeholders; and Acceptability, if the program is considered attractive, adequate and useful. In addition, it was proposed an evaluation matrix, which displays guidelines on how to quantify and measure these subdimensions. However, this methodological framework has not yet been applied to conduct a feasibility evaluation of a mindfulness-based intervention in a healthcare setting.

The aim of the present study is to conduct a feasibility evaluation of a mindfulness-based stress reduction program for primary care professionals in Brazilian national health system. This study will evaluate and discuss the feasibility levels (Highly feasible, Feasible, Lowly feasible, Unfeasible) of the distinct components of the mindfulness program, as well as the program's overall feasibility.

2. Materials and methods

The present study has a pre-post design [14] and was composed of three stages. The first stage was the development of self-report questionnaires to measure the feasibility indicators proposed in the evaluation matrix (Supplementary Material). The four questionnaires were developed to address the key stakeholders in the implementation of the mindfulness program: one questionnaire to be responded by the manager responsible for the healthcare unit before the intervention, one to be responded by the mindfulness instructor before the intervention, one to be responded by the participants of the mindfulness program before the intervention and one by the participants after the intervention.

The questionnaires items were developed based on research literature that suggests criteria for the feasibility of different components of mindfulness-based interventions and aimed to closely match the indicators of the evaluation matrix. For example, the UK Network for Mindfulness-Based Teachers [15](p1) recommends a "professional qualification in mental or physical health care, education or social care or equivalent life experience". Therefore, the first item developed for the instructor questionnaire was "Your professional qualifications is: ❑ Health care professional, ❑ Mental health professional, ❑ Educator, ❑ Social assistant, ❑ Other. Answer:". The response to this item was later used to complete the matrix indicator "Existence of a qualified

Table 2
Judgment matrix of the feasibility of a mindfulness-based program for primary care professionals in Brazilian national health system.

Judgment matrix				
Subdimensions	Σ Scores	Results	Value judgment	
			Subdimensions	Dimensions
PRACTICALITY Weight = 1	Σ Scores 6 = Highly feasible [6] 5-4 = Feasible [4] 3-0 = Unfeasible (0)	5	Feasible (2 points)	**ORGANIZATIONAL CONTEXT** Σ Scores 9-8 = Highly feasible [3] 7-6 = Feasible [2]
ADAPTATION Weight = 1	Σ Scores 6-5 = Highly feasible [6] 4 = Feasible [4] 3-2 = Lowly Feasible [2] 1-0 = Unfeasible (0)	3	Lowly Feasible (1 points)	5-4 = Lowly Feasible [1] 3-0 = Unfeasible (0) **Result:** 6 **Value judgment:** Feasible (2 points)
INTEGRATION Weight = 1	9-8 = Highly feasible [3] 7-6 = Feasible [2] 5-4 = Lowly Feasible [1] 3-1 = Unfeasible (0)	8	Highly feasible (3 points)	
DEMAND Weight = 1	6-5 = Highly feasible [3] 4 = Feasible [2] 3-2 = Lowly Feasible [1] 1-0 = Unfeasible (0)	6	Highly feasible (3 points)	**STAKEHOLDERS PERSPECTIVE** Σ Scores 9-8 = Highly feasible [3] 7-5 = Feasible [2]
ACCEPTABILITY Weight = 2	36-26 = Highly feasible [6] 25-17 = Feasible [4] 16-07 = Lowly Feasible [2] 6-0 = Unfeasible(0)	28	Highly feasible (6 points)	4-3 = Lowly Feasible [1] 2-0 = Unfeasible (0) **Result:** 9 points **Value judgment:** Highly feasible (3 points)
Mindfulness Meditation Program	6 = Highly feasible 5-4 = Feasible 3-2 = Lowly Feasible 1-0 = Unfeasible	5	**Value judgment:** FEASIBLE	

professional to conduct the program" (Table 1) which evaluates, together with years of meditation practice and certified formation as a mindfulness teacher, if the instructor has the recommended professional background.

The questionnaires were then presented to three experts in the field: a clinical psychologist with extensive background in mindfulness meditation and mindfulness-based cognitive therapy; a senior professor of occupational epidemiology, with research focus on mental health in the workplace; and a senior professor of public health, with research focus on evaluation of health programs in national health systems. Consensus methods were used [16] to propose and perform modifications in the questions, aiming to ensure content and face validity. For example, the experts agreed that the item responded by the manager "Do you know what mindfulness meditation is?" needed to contain the category of "I heard about it, but I don't know what mindfulness meditation is" in addition to "Yes, I know what is mindfulness meditation" and "No, I don't know what is mindfulness meditation". Since mindfulness has been receiving increase coverage from the media and non-scholarly sources, the experts judged that it was important to differentiate the managers who actually knew what mindfulness is from those who just heard about the practice. The item was then modified to include this additional category. Regarding the questionnaire validity and reliability, the questionnaire items will be used to evaluate feasibility levels through *a formative model* using the evaluation matrix; therefore, psychometric analysis traditionally used with *reflective models* (e.g. factor analysis, item response theory) [17] were not employed. The internal consistency reliability of the questionnaires applied to the participants before the intervention ($\alpha =$ 0.72–95% CI [0.54, 0.91]) and after the intervention ($\alpha =$ 0.72–95% CI [0.49, 0.96]) was adequate. The internal consistency reliability of the other two questionnaires could not be assessed since they were answered by a single individual (e.g. manager, instructor).

The second stage was the execution of the mindfulness-based intervention. The mindfulness-based program was offered in the city of Biguaçu, a small city in the south of Brazil with an estimated resident population of 63.440. The city of Biguaçu has 15 Basic Health Units (primary care units) in which 20 Family Health teams and 2 Family Health Support teams operate. The study inclusion criterion was being a health professional working in the primary care. The Term of Informed Consent for the participants was prepared and approved by the Ethics and Research Committee of the Universidade Federal de Santa Catarina on October 24th, 2016 (n° 1.788.519). The healthcare professionals received an invitation by email and participation was voluntary. After the recruitment, a number of 26 primary care professionals decided to take part in the mindfulness program. Informed consent was obtained from all individual participants included in the study, including the manager of the City Health Department and the mindfulness instructor. The mindfulness program was conducted through the course of four weekly encounters during the month of November 2016, with the duration of an hour and a half each [18]. Two different groups were established and both simultaneously received the same intervention. The mindfulness instructor was a physician who worked in primary care in a neighboring city.

The third stage of the study was the data collection and execution of the feasibility evaluation. Data was collected through direct observations by the researchers and the four self-report questionnaires responded by the participants of the study. The information was then used to complete the evaluation matrix (Table 1). For example, one indicator of the matrix is the "Adequate material for the program activities". It was evaluated through direct observation of the availability of materials such as projectors, chairs and meditation cushions in the room where the intervention occurred and the results were recorded on the evaluation matrix. In the case of indicators such as "Recommendation of the mindfulness meditation program to colleagues", the responses from the self-report questionnaires ("Would you recommend the mindfulness-based stress reduction program to a work colleague?") were tabulated and later inserted into the matrix. The data collected for each indicator was then compared to the parameters (e.g. more than 75% of the participants recommending the program would lead to a judgment of "Highly feasible" for this indicator), making it possible to reach a value judgment about the feasibility level of different components of the mindfulness-based program.

The last step in the evaluation process was the use of the judgment matrix (Table 2), which is an extension of the evaluation matrix. The judgment matrix allowed, through progressive weighted summation, the synthesis of the feasibility levels of each indicator previously defined on the evaluation matrix into a broader feasibility level for the subdimensions, dimensions and for the whole program. For example, the subdimension Adaptation is composed of two indicators "Program extension" and "Existence of a qualified professional to conduct the program". In case these indicators were previously judged on the evaluation matrix as "Highly Feasible" (i.e. both indicators had a score of 3), the weighted summation on the judgment matrix would result on a score of 6, indicating the Adaptation subdimension as "Highly Feasible" as well. For an in-depth explanation of the process of weighted summation of the judgment matrix, please refer to Santiago et al. [13].

3. Results

The results of the application of the evaluation matrix are displayed in Table 1.

In Table 1, the "Indicator" column displays one indicator of the program's feasibility, the "Measure" column indicates how the indicator is going to be objectively evaluated, the "Parameter" column indicates the criteria that will be used to judge the feasibility level and the "Feasibility level" indicates the study results. For example, the first indicator "Adequate space for the program activities" measured if the physical space where the mindfulness-based intervention occurred had: a) an adequate size to fit all participants; and b) was used exclusively by the participants during the intervention. In the current study, the intervention happened at an auditorium at the City Health Department, which large interior provided enough space to accommodate all the participants. In addition, since the auditorium at the City Health Department was a different place from the primary care professionals' workplace (i.e. the Basic Health Units), the professionals knew they would not be disturbed by any work-related demands or interruptions. Table 1 shows that for the indicator "Adequate space for the program activities" (Column 1), the auditorium where the intervention happened achieved both requirements (Column 2) and the answer to a) and b) was "YES" (Column 3). For this reason, the indicator "Adequate space for the program activities" was judged as "Highly feasible" (Column 4).

The next indicator evaluated was "Adequate material for the program activities". The auditorium had a sufficient number of chairs for all participants and a high-quality projector. The only items that the City Health Department did not possess were the meditation cushions. For this reason, the indicator "Adequate material for the program activities" was considered Feasible. The Subdimension Practicality was judged as "Feasible".

The indicator "Program extension" was judged as "Lowly feasible". The manager of the City Health Department argued that it would only be possible to run the program in its brief version instead of the traditional 8-week format. The next indicator examined was "Existence of a qualified professional to conduct the program" and it was judged as "Feasible". The mindfulness instructor that conducted the intervention in this study is a physician by training (a compatible professional qualification), has at least three years of regular mindfulness meditation practice but never undertook a supervised training to become a mindfulness instructor. The Adaptation subdimension was judged as "Lowly feasible".

The indicator "Existence of other workers' health programs or interventions" was judged as "Feasible". The manager reported that in the last three years the City Health Department carried out two interventions aimed at promoting workers' health in the municipality. These previous experiences were a facilitator for the implementation of the mindfulness-based program because, when the mindfulness intervention was proposed, the manager acknowledged it as congruent with the occupational health policies. The indicator "Availability of time during working hours to participate in the intervention" was judged as "Highly Feasible" since all the four sessions were executed during working hours.

The next indicator evaluated was "Availability of strategies to cover the professional in his absence". To deal with professional coverage while participants were away from the Basic Health Units, the manager proposed the division of the primary care professionals into two groups, both which would receive the intervention separately. This strategy allowed fewer professionals out of work simultaneously and the professionals who stayed at their jobs were able to perform the functions of those who were at the mindfulness program. For this reason, this indicator was judged as "Highly Feasible". The sub-dimension Integration was judged as "Highly Feasible". The dimension Organizational Context, which is composed of the subdimensions Practicality, Adaptation, and Integration, was judged as "Feasible" for the implementation of a mindfulness-based intervention.

The indicator "Perception of stress" was judged as "Highly Feasible". The results from the questionnaires indicated that 72% of the primary care professionals perceived themselves as stressed at the workplace, and 100% believed that the stress was caused by sources pertaining to their work environment. The most cited sources of stress were "high job demands", "concerns about the well-being of patients", "problems with patients' behavior" (such as aggressiveness, impatience, among others), "concomitance of care and administrative activities", "lack of appropriate materials", "lack of a sufficient number of work colleagues" and "problems in the infrastructure". The results indicated even higher percentages in respect to the perception of stress in their work colleagues, with 96% of the primary care professionals reporting that they perceive their colleagues as stressed and 92% believing the stress is due to the work environment.

The next indicator was "Perception of the need for a stress reduction intervention", which was judged as "Highly feasible". The questionnaires responses indicated that 92% of the primary care professionals believed that a stress-reduction intervention was necessary. The most cited stress-reduction interventions were "breaks at work for resting and leisure", "more appreciation of their work", "relaxation groups", "group psychotherapy" and "spaces where the professionals can expose their opinion". The subdimension Demand was judged as "Highly feasible".

The indicator "Previous manager knowledge of mindfulness meditation" was judged as "Feasible". When questioned, the manager explained that she heard about the mindfulness meditation for the first time when the program was proposed and, consequently, she did not know about the scientific evidence that supports it. The indicator "Adherence of professionals to the program" was judged as "Highly Feasible". In the present study, 76% of the primary care professionals that were invited participated in the first session.

The following indicator was "Retention of the professionals in the program". The results showed that 64% of the professionals who initiated the program attended to at least three meetings, so it was judged as "Lowly feasible". The indicator "Recommendation of the mindfulness meditation program to colleagues" was judged as "Highly Feasible" since 100% of the participants would recommend the mindfulness-based stress reduction intervention to their work colleagues.

The indicator "Perception of work overload due to the intervention" was judged as "Highly Feasible". The results indicated that 7% of the professionals perceived work overload due to their participation in the mindfulness-based program. In the questionnaire, the most cited reason was that the professionals were able to avoid work overload "by organizing my work routine". In several responses, the professionals described that they were already used to administer their clinical practice together with team meetings, home visits, and conferences, and the mindfulness intervention became only one more activity in their schedule.

The last indicator was "Perception of the program as effective to reduce organizational stress", which was judged as "Highly Feasible".

In this study, 100% of the participants considered the mindfulness-based program as effective to reduce their organizational stress. The most cited reasons were that the intervention helped them "reduce stress" and "deal with my own thoughts". The subdimension Acceptability was judged as "Highly feasible". The dimension Stakeholders Perspective, composed of the subdimensions Demand and Acceptability, was judged "Highly Feasible" for the implementation of a mindfulness-based intervention.

The progressive weighted summation for subdimensions, dimensions and the overall program is displayed in Table 2.

In Table 2, the results should be interpreted starting with the subdimensions, and progressively with dimensions and overall program. For example, since the *indicators* "Adequate space for the program activities" was previously judged as "Highly Feasible" (score = 3 points) and the indicator "Adequate material for the program activities" was judged as "Feasible" (score = 2 points) (Table 1), the result of summing the two (result = 5) (Column 3) when compared to the parameters (5–4 = Feasible) (Column 2) indicates that the *subdimension* Practicality was judged as "Feasible" (score = 2 points) (Column 4).

The same procedure was applied to discover the feasibility levels of the dimensions. Since the *subdimension* Demand was judged as "Highly Feasible" (score = 3 points) and the *subdimension* Acceptability was judged as "Highly Feasible" (score = 6 points – this number is already weighted by 2) (Column 4), the result of summing the two (result = 9) (Column 5) when compared to the parameters (9–8 = Highly Feasible) (Column 5) indicates that the *dimension* Stakeholders perspective was judged as "Highly Feasible". Finally, after the summation of the dimension Organizational Context (score = 2 points) and Stakeholders perspective (score = 3 points) (Column 5), the results for the overall program (result = 5) compared to the parameters (5–4 = Feasible) (i.e. both displayed on the final row), indicates that the mindfulness-based program for primary care professionals was judged as "Feasible" to be implemented in the Brazilian national health system.

To improve the interpretability of the results, the feasibility levels of the components of the mindfulness-based program are displayed in Table 3 without the mathematical operations.

4. Discussion

The present study aimed to conduct a feasibility evaluation of a mindfulness-based stress reduction program for primary care professionals in Brazilian national health system. The results showed that the mindfulness-based program for primary care professionals was "Feasible" to be implemented in Brazilian national health system, and the feasibility levels differed for certain aspects of the program.

The first subdimension evaluated was Practicality, the extent to which a program can be implemented using the available resources. The execution of the mindfulness program in the auditorium at the City Health Department, a distinct location from the primary care professionals' workplace, prevented work-related interruptions during the intervention and allowed the professional to concentrate exclusively on the mindfulness practices [19]. The choice for the auditorium, however, had the disadvantage that it took time for the professionals to drive from the Basic Health Units to the City Health Department. The time constraint was one of the reasons why the manager chose a brief version of the mindfulness-intervention, with four weekly encounters and sessions of one hour and a half [18], instead of the traditional model developed by Kabat-Zinn [20] with eight weekly encounters [21] that was initially proposed. In addition, in almost all sessions one or two primary care professionals arrived a few minutes late. Nevertheless, the advantages of the auditorium in terms of space and privacy were considered to outweigh the disadvantages caused by the distance from the professionals' workplace.

In respect to the adequacy of the materials, the availability of a high-quality projector was useful when the instructor was delivering psychoeducation sections or indicating homework [22]. The main shortcoming was that the City Health Department did not possess meditation cushions. Although the mindfulness practices were done using the chairs, meditation cushions allow the instructor to teach more traditional and even considered preferable meditation positions, such as the half-lotus or the full-lotus. The availability of meditation cushions can provide an additional option in case the practitioner feels discomfort by using the chair [23]. The Brazilian national health system has a policy that guides the implementation and regulates the practice of integrative and complementary therapies [24] and some of these practices, such as yoga, use meditation cushions. Therefore, one recommendation derived from the findings of this study is that meditation cushions should be acquired by the City Health Department to be used in the future not only for mindfulness interventions in primary care but also for other integrative and complementary therapies.

The subdimension Adaptation, which evaluates the program capacity to adapt to a new organizational context, was the only one judged as "Lowly Feasible". The main reason was the impossibility of implementing the program in the initially intended format (i.e. 8 weeks with sessions during at least 2 h) [21]. The manager of the City Health Department argued that not only the time the participants took to arrive at the auditorium needed to be accounted for but longer mindfulness sessions would result in professionals staying more time off-duty and could potentially compromise the proper functioning of the Basic Health Units. The results from this study support the evidence that traditional mindfulness-based programs not always fit the often-restrictive possibilities of organizations and healthcare institutions, leading to the demand for and subsequent implementation of briefer formats [18,25,26]. One implication is that future research should focus on the feasibility and efficacy of brief mindfulness intervention for health care professional in real-world scenarios (e.g. feasibility studies, pragmatic clinical trials).

Another challenge for the implementation of the mindfulness-based program was the availability of a qualified instructor. Although a multiplicity of requirements has been proposed over the last decades [15], some main recommendations for mindfulness instructors seem to be consistent among different sources: that the instructor has years of experience and maintains a regular meditation practice; and that he/she has a compatible professional qualification or had taken a specific formation course for mindfulness instructors [27]. The rigorous requirements make the training of mindfulness teachers one of the highest costs when implementing mindfulness-based interventions on a large scale [10]. For this reason, a key strategy available for managers is to search for qualified professionals within the system. Recent research has shown that many healthcare professionals had already undertaken a formation course in some form of complementary and integrative therapy by their own personal interest. They might be only temporarily discouraged by the lack of institutional support, seeking an opportunity to apply in their clinical practice what they have learned [28]. This is exactly what happened in the present study: the physician who conducted the program already worked within the system (i.e. he was as a primary care physician in a neighboring city) and had a previous interest in conducting a mindfulness-based intervention for primary care professionals.

In contrast to the Adaptation subdimension, other subdimensions of the program such as Integration were judged as "Highly Feasible". The existence of organizational policies in the City Health Department aiming at promoting workers' health facilitated the implementation of the mindfulness-based intervention and its execution within working hours. This was important since if it is required for the professional to use their hours off work or weekends to participate in mindfulness programs, the adherence can be reduced [29]. In addition, the strategy of creating two groups was successful in allowing the professional to participate without leaving their post unattended. The lack of coverage by other professionals can make it difficult for healthcare professionals to temporarily leave their jobs to participate in the mindfulness program [29].

Table 3
Feasibility levels of the mindfulness-based program for primary care professionals in Brazilian national health system.

Indicators	Subdimensions	Dimensions	Program
Adequate space for the program activities	**Practicality**	**Organizational Context**	**Mindfulness-based program for primary care professionals in Brazilian national health system**
Adequate material for the program activities			
Program extension	**Adaptation**		
Existence of a qualified professional to conduct the program			
Existence of other workers' health programs or interventions	**Integration**		
Availability of time during working hours to participate in the intervention			
Availability of strategies to cover the professional in his absence			
Perception of stress	**Demand**	**Stakeholders Perspective**	
Perception of the need for a stress reduction intervention			
Previous manager knowledge of mindfulness meditation	**Acceptability**		
Adherence of the professionals to the program			
Retention of the professionals in the program			
Recommendations of the mindfulness meditation program to colleagues			
Perception of work overload due to the intervention			
Perception of the program as effective to reduce organizational stress			

Legend: Unfeasible Lowly Feasible Feasible Highly Feasible

The results of the subdimension Demand, also judged as "Highly Feasible", showed that the majority of the professionals perceived themselves as stressed, believed they needed a stress reduction intervention and suggested potential psychological interventions (e.g. "relaxation groups", "group psychotherapy"). The sources of stress reported by the primary care professionals are in agreement with what was found in previous studies: the two most cited factors were interpersonal relationships with patients [30] and structural problems (e.g. lack of materials and adequate number of professionals) [2,31]. It should be noticed that, in the current study, the structural problems were mentioned more times than the relationship with patients. Although mindfulness interventions have been shown as efficacious in helping healthcare professionals cope with stress, the implementation of mindfulness-based programs should not be used to mask the underlying structural problems existent in the context of primary care or to act as a substitute to direct modifications in the health care system. The problems that arise when mindfulness interventions are distorted to the pursuit of corporate objectives, a phenomenon which has been named "McMindfulness" [32], have been recently discussed by Hyland [33]. Accordingly, the results of this study indicated that the mindfulness intervention was perceived by the professionals as effective to reduce stress, but it is also necessary structural level modifications to remedy the problems disclosed by the professionals in their questionnaire responses.

The third subdimension judged as "Highly Feasible" was Acceptability. The primary care professionals had a high adherence to the program (i.e. 76% of the professionals invited participated in the first session) and this facilitates a future implementation since management wants to be sure that all the efforts and resources assembled to allow the execution of the intervention were not in vain [34]. It is hypothesized that the high adherence in this study might have been caused by the high demand for a stress-reduction intervention as indicated by the professionals.

In the current study, all primary care professionals (100%) said that they would recommend the program to their work colleagues. This result is consistent with previous findings, in which 98% of medical students would recommend a mindfulness-based stress reduction program to their peers [35]. In addition, although the benefits of a mindfulness intervention usually appear gradually [29] and participants might not perceive them, all primary care professionals (100%) considered the program as effective in reducing their stress. One fundamental aspect of the feasibility of a program is if the participants actually consider it to be useful [12] and the shared perception of the effectiveness contributed to the overall high acceptability. However, the extremeness of the agreement in both cases by the *totality* of the primary care professionals should be interpreted with caution. One possible explanation is that, since participation was voluntary, the professionals who decided to participate (76% of those invited) had a

previous positive inclination towards complementary practices. It is expected that, if the program is applied to all primary care professionals and not only those who decided to participate in this study, the acceptance would be less homogenous. Therefore, the generalizability of these results to a large-scale implementation in Brazil needs to be further investigated.

The only aspect of the subdimension Acceptability that diverged was the retention of the professionals in the program. Retention rates were low (64%) compared to the average retention rate (83%) for mindfulness-based interventions in adult non-clinical populations [36,37]. The retention of the participants is critical to a program's efficacy since most programs require participation throughout the majority of sessions to produce the intended outcomes. Program evaluations have increasingly focused on participants' retention and the causes of premature leave [38]. The literature indicates some reasons why participants might end up abandoning a mindfulness-based intervention. One of the purposes of a mindfulness-based program is to allow individuals to get in contact first with more innocuous aspects of their experience (such as bodily sensations), and then encourage them to progressively get in contact with more conflicting topics such as negative thoughts. For participants who are involved in thought suppression, for example, to discover the content of these thoughts over the program can be frightening, leading them to quit before the final sessions [39]. The findings of this study suggest that a necessary procedure before a large-scale implementation is to improve the questionnaire by including questions that investigate why participants abandoned the intervention before its conclusion. These questions could help uncover the reasons behind the low retention rates in mindfulness-based interventions and guide the tailoring of context-specific plans of action, such as one-on-one consultations for those experiencing higher emotional discomfort throughout the program.

Finally, when considering all aspects, the high acceptability of the mindfulness-based program by the participants of this study is congruent with recent findings. For example, in a study conducted by Clarke et al. [40] regarding the feasibility of a mindfulness intervention for patients with dementia in care homes, 70% or more participants reported being “very satisfied” with the meditation practices. In another feasibility study of a brief mindfulness intervention for patients with pulmonary disease, Perkin-Porras et al. [26] reported that 83% found the intervention moderately or very useful compared to 50% in the control group.

The strengths of the present study include the fact that the researchers had access to the City Health Department manager and she agreed to collaborate with the study and respond to the questionnaire. Many feasibility studies investigating mindfulness interventions are conducted with participants only [26,40,41], but management is one of the most important stakeholders for the program's implementation. Another strength was that, instead of using pre-existing psychological measures, the questionnaires applied were developed specifically to evaluate the feasibility of a mindfulness program through its different components. Therefore, it was possible to obtain information about many relevant specific topics, such as the instructor's years of meditation experience and frequency of weekly formal practice, if the participants believed they needed a stress reduction intervention (i.e. answered prior to the intervention), among others. The present study has also limitations. Firstly, the study had a pre-post design and a control group was not included. Future studies should assign participants to a control group to receive another integrative and complementary practice. The comparison of the intervention with the control group will then make it possible to understand which aspects of the feasibility were specific to the mindfulness intervention. For example, it will be possible to evaluate if the high adherence was related to a mindfulness intervention or if another intervention (e.g. acupuncture) would have high adherence as well. Secondly, the municipality of Biguaçu might not be representative of most Brazilian cities since it has a high Human Development Index [42]. Other municipalities might not have the same available resources or the necessary number of professionals to cover those who were participating in the intervention. Finally, it is recommended for future studies to expand the questionnaire and further investigate its psychometric properties. One suggested improvement is the inclusion of new items to evaluate how much time the professionals spent on the mindfulness practices outside of the sessions and if they were able to successfully complete the recommended meditation exercises. Primary care professionals might have double shifts, and the availability of free time to practice at home is a key aspect of the feasibility of a mindfulness-based program. It is also possible to include a new Financial dimension to examine the costs involved throughout the intervention. Finally, psychometric properties can be further studied by considering alternative measures of feasibility, so the criterion validity of the questionnaires can be evaluated.

5. Conclusion

The present study applied a newly developed framework for evaluating the feasibility of mindfulness-based interventions for primary care professionals in the Brazilian national health system. The implementation of a mindfulness-based program for primary care professionals in Brazilian national health system was judged as “Feasible”. The two main barriers found were the need for a brief version of the program to accommodate the restrictive timetable of the primary care professionals and the low retention rates. This study findings suggest that, although a large-scale implementation in Brazilian national health system is feasible, it is necessary to choose and agree upon which brief version of the mindfulness-based intervention should be adopted, as well as to develop instruments to diagnose the reasons why participants might be abandoning the intervention before its conclusion. The results indicated that there is a high demand for stress-reduction interventions within the context of primary care. In addition, the acceptability by the stakeholders (participants and management) was excellent. Future studies need to conduct feasibility evaluations in other municipalities of Brazil to ensure the generalizability of these results.

Compliance with ethical standards

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Authorship

All persons who meet authorship criteria are listed as authors. Pedro Henrique Ribeiro Santiago and Cláudia Flemming Colussi conducted the consensus method through the traditional committee meeting. Leonardo Rodrigues Valle Serra e Meira adapted the mindfulness intervention to a brief format. Pedro Henrique Ribeiro Santiago collected and tabulated the data. Leonardo Rodrigues Valle Serra e Meira and Pedro Henrique Ribeiro Santiago analyzed the data. Cláudia Flemming Colussi supervised the findings of this work.

Conflicts of interest

The authors declare that they have no conflict of interest.

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Appendix A. Supplementary data

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