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Original Article

Mindfulness, mindful eating and intuitive eating in the approach to obesity and eating disorders*

Marina Rodrigues Barbosa[1,2]
https://orcid.org/0000-0001-7502-243X
Fernanda Rodrigues de Oliveira Penaforte[3]
https://orcid.org/0000-0001-8483-1562
Ana Flavia de Sousa Silva[4]
https://orcid.org/0000-0003-0000-8953

Objective: to examine and summarize studies of mindfulness, mindful eating and intuitive eating in the approach of overweight / obesity and eating disorders. Method: for this integrative review, PubMed, PePSIC, PsycINFO, LILACS, IBECS, SciELO and BVS-Psi databases were consulted, and published articles published in the last 10 years. After analyzing the recovered studies, 38 articles made up the final review corpus. Results: the studies demonstrated the benefits of approaches centered on mindfulness, mindful eating and intuitive eating on eating behavior and on the emotional and psychological aspects of overweight and eating disorders individuals, harmful or emotional, followed by external factors and compulsive eating; as well as levels of stress, anxiety and depression. For weight loss, the results are less consistent, since several studies have found no difference for this parameter. Conclusions: as selected focused on mindfulness, mindful eating and intuitive eating are promising for addressing obesity and obesity and eating disorders, especially with regard to eating behavior and psycho-emotional aspects.

Descriptors: Mindfulness; Eating Behavior; Cognitive Behavioral Therapy; Intuitive Eating; Eating Disorder; Mindfulness-Based Intervention.

* This article refers to the call "Mindfulness and other contemplative practices".

[1] Universidade Federal de Uberlândia, Faculdade de Medicina, Uberlândia, MG, Brazil.
[2] Universidade de São Paulo, Escola de Enfermagem de Ribeirão Preto, PAHO/WHO Collaborating Centre for Nursing Research Development, Ribeirão Preto, SP, Brazil.
[3] Universidade Federal de Uberaba, Curso de Nutrição, Uberaba, MG, Brazil.
[4] Universidade de São Paulo, Faculdade de Medicina de Ribeirão Preto, Ribeirão Preto, SP, Brazil.

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Mindfulness, mindful eating e comer intuitivo na abordagem da obesidade e transtornos alimentares

Objetivo: realizar uma revisão integrativa da literatura acerca do papel das intervenções baseadas em *mindfulness*, *mindful eating* e comer intuitivo na abordagem do sobrepeso e obesidade e dos transtornos alimentares. Método: para esta revisão foram consultadas as bases PubMed, PePSIC, PsycINFO, LILACS, IBECS, SciELO e BVS-Psi, e incluídos artigos publicados nos últimos 10 anos. Após o processo de análise dos estudos recuperados, 38 artigos compuseram o *corpus* final da revisão. Resultados: os estudos demonstraram os benefícios das abordagens centradas no *mindfulness*, *mindful eating* e comer intuitivo no comportamento alimentar e nos aspectos emocionais e psicológicos dos indivíduos com excesso de peso e transtorno alimentar, reduzindo o comer emocional, comer guiado por fatores externos, e episódios de *binge eating*; bem como reduzindo os níveis de estresse, ansiedade e depressão. Para a perda de peso, os resultados são menos consistentes, haja visto que diversos estudos não observaram diferença para este parâmetro. Conclusões: as intervenções centradas no *mindfulness*, *mindful eating* e comer intuitivo são promissoras para a abordagem do sobrepeso/obesidade e dos transtornos alimentares, especialmente no que tange ao comportamento alimentar e aos aspectos psicoemocionais.

Descritores: Atenção Plena; Comportamento Alimentar; Comer Intuitivo; Transtorno Alimentar; Terapia Cognitivo Comportamental; Intervenções Baseadas em Mindfulness.

Atención plena, alimentación consciente y alimentación intuitiva en el abordaje del obesidad y de los trastornos alimentarios

Objetivo: desarrollar una revisión integrativa de la literatura sobre el papel de las intervenciones basadas en el *mindfulness*, *mindful eating* y alimentación intuitiva en el abordaje del sobrepeso / obesidad y de los trastornos alimentarios. Método: para esta revisión, se consultaron las bases de datos PubMed, PePSIC, PsycINFO, LILACS, IBECS, SciELO y BVS-Psi, y se incluyeron artículos publicados en los últimos 10 años. Después de analizar los estudios recuperados, 38 artículos constituyeron el *corpus* final de la revisión. Resultados: los estudios han demostrado los beneficios las intervenciones basadas en el *mindfulness*, ME y alimentación intuitiva para el comportamiento alimentario y los aspectos emocionales y psicológicos de las personas con sobrepeso/obesidad y trastornos alimentarios, reduciendo la alimentación emocional, el comer basado en factores externos y en los episodios de *binge eating*; además de reducir los niveles de estrés, ansiedad y depresión. Para la pérdida de peso, los resultados son menos consistentes, dado que varios estudios no han encontrado diferencias para este parámetro con las intervenciones. Conclusiones: las intervenciones basadas en el *mindfulness*, mindful eating y alimentación intuitiva son prometedoras para el abordaje del sobrepeso/obesidad y de los trastornos alimentarios, especialmente con respecto al comportamiento alimentario y los aspectos psicoemocionales.

Descriptores: Conducta Alimentaria; Atención Plena; Terapia Cognitivo-Conductual; Alimentación Intuitiva; Trastorno Alimentario; Intervención Basada en la Atención Plena.

Introduction

Excess body weight is one of the most challenging public health problems today. Despite its increasing prevalence, and the vast knowledge about its numerous negative health consequences[1], the treatment for this condition remains difficult to be adhered to. Consequently, much has been questioned about the principles on which the traditional approaches to overweight are focused, which commonly rely almost exclusively on the premise of diets, with quantitative and/or qualitative restriction on food intake. It is speculated that the unsatisfactory results of this approach are mainly related to the non-promotion of changes in dysfunctional eating behaviors[2-3].

In turn, eating disorders (EDs), mainly characterized by persistent disturbance in eating or in the behavior related to eating, resulting in excessive intake or strict avoidance of food[4], although they are considered of low prevalence, also present significant degrees of morbidity and mortality, in addition to great personal and psychosocial losses[5].

The approach to overweight and EDs is complex and difficult to manage, especially because they are conditions that are related to dysfunctional relationships with eating and food, and with impairment of the psychosocial functioning of the subject[6-7]. In this scenario, innovative strategies employed in the approach of dysfunctional eating behaviors have emerged, with emphasis on *mindfulness, mindful eating*, and intuitive eating. *Mindfulness* is described as a state of consciousness that emerges through the attention that is intentionally given to the present moment without judgment. Because it is a state of awareness, *mindfulness* can be developed and trained, through formal and informal practices[8].

Within *mindfulness*, with a special look at attention to aspects related to eating and food, *mindful eating* (ME), or "eating with full attention", emerges. ME recommends that the subjects make their food choices consciously and attentive to the physical signs of hunger and satiety[9]. Another important premise of ME is the attention to the entire experience involved in eating, noting the effects of food on the senses and on the physical and emotional sensations that occur before, during and after eating, with openness and without judgments[10-11].

Intuitive eating (IE) or "intuitive nutrition", although less known, follows the same line and is generally used interchangeably with ME, especially since both recommend eating being guided by the physiological signs of hunger and satiety[12]. IE has ten principles, with emphasis on rejection of diets, unconditional permission to eat; eating for physical, not emotional reasons; and confidence in the body and in the signals of hunger and satiety to determine when and how much to eat[13-15].

Because these are innovative approaches, the systematization of knowledge regarding their outcomes for the health of subjects with overweight and EDs, are few, although growing in numbers. Some reviews were conducted with the objective of evaluating the effects of *mindfulness*-based approaches on weight loss[16-17], on the treatment of obesity and eating disorders[18-19], or on the specific treatment for eating disorders[14,20-21]; others sought to verify the effects of *mindful eating* on weight loss[22] or on the approach to obesity and eating disorders[23]. However, no reviews were found that gathered the results of interventions based on *mindfulness*, *mindful eating* and intuitive eating in the eating behavior, physical aspects and psychoemotional aspects in overweight and obese individuals, and with EDs. Specifically in the national scenario, only one integrative review study was found in the specific theme of *mindful eating*[23]. Therefore, this study aimed to conduct an integrative review of the literature of the growing body of research studies that investigated the role of *mindfulness*, *mindful eating*, and intuitive eating in the approach of overweight, obesity and EDs, especially with regard to results in the eating behavior and in the physical and psychoemotional aspects, seeking to contribute to the reduction of this knowledge gap. The systematization of this knowledge is important to broaden the understanding of its applicability, especially for conditions that are related to dysfunctional eating behaviors.

Method

This is an integrative review of the scientific literature, which aims to synthesize and deepen the knowledge about a given subject matter, seeking consolidated evidence for evidence-based practice[24-25].

For this review, standardized procedures were adopted[26], namely: (1) identifying the theme and the guiding question; (2) establishing inclusion/exclusion criteria; (3) categorizing the studies; (4) evaluating the studies; (5) interpreting the results; (6) synthesis of knowledge[26]. The international protocol for systematic review studies and meta-analyses, PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) was also adopted to guide both the inclusion and exclusion of the articles in the review, as well as the writing of this study[27].

For this review, the guiding question was defined using the PICO method, which provides for

the definition of the participant (P), intervention (I), comparison (C) and outcome (O)[28]. The comparison item was not used in this study, so criterion C was excluded from the writing of the question. This change is foreseen in the PICO methodology in some cases. The main question of the study was the following: What are the results in the eating behavior, physical aspects and psychoemotional aspects (O) of approaches centered on *mindfulness*, *mindful eating* and intuitive eating (I) in subjects with overweight, obesity and eating disorders (P)?

Article selection path

The selection of the articles took place between October and December 2019. Searches were carried out in the PubMed, PePSIC, PsycINFO, Latin American and Caribbean Literature in Health Sciences (*Literatura Latino-Americana e do Caribe em Ciências da Saúde*, LILACS), IBECS, Scientific Eletronic Library Online (SciELO) and BVS-Psi databases. Academic papers in Portuguese, English and Spanish were considered. These databases were chosen because they encompass vast literature, in the national and international scopes, published on the topic of interest, and also because they include renowned journals in the health area.

For the searches, indexed descriptors were used according to DeCs/MeSh standardization, in their Portuguese and English versions. The indexed descriptors used were the following: *transtorno alimentar* (eating disorder or feeding disorder), *comportamento alimentar* (eating behavior), *atenção plena* (Mindfulness), *obesidade* (obesity) and *excesso de peso* (overweight). Other non-indexed descriptors, but directly related to the theme, were also used, namely: mindful eating and intuitive eating. These keywords appeared in at least one of the following search fields: title, abstract, subject or keyword.

The following criteria were adopted for including the articles: (a) articles published between January 2009 and December 2019; (b) empirical studies that explicitly and specifically used programs with approaches centered on *mindfulness*, *mindful eating* and intuitive eating; (c) studies conducted with adults; (d) which were freely available for reading in full; and (e) published in Portuguese, English and Spanish. The exclusion criteria were the following: (a) studies with children and older adults; (b) materials such as monographs, editorials, books, book chapters, reviews and abstracts in conference proceedings; (c) literature review articles; (d) articles from clinical cases; (e) qualitative studies; (f) studies on the elaboration and/or validation of scientific protocols or instruments; (g) studies carried out with intervention programs/techniques that use some elements of *mindfulness*, *mindful eating* and/or intuitive eating, but are not focused on these approaches. Studies that were repeated in more than one database were computed only once.

To check whether the articles found met the inclusion and exclusion criteria, their respective titles and abstracts were read. This procedure was performed by two independent judges, both familiar with the topic. In case of disagreement, the analysis was made by a third judge, also with experience in the theme. The articles selected in this first stage were retrieved for reading in full, and the inclusion and exclusion criteria were again applied in the full texts. The articles that remained, after analysis by full reading, made up the final analysis *corpus* of this study.

For the analysis stage, a record was made of all the articles that made up the final *corpus*, compiling the following information: title, authors, year, place of publication, method/type of study, sample, objectives and main results. The full analysis of the articles allowed for the organization of categories that aim to answer the guiding question of this review.

Results

Categorization of the articles

The searches in the databases resulted in a total of 785 articles. The database with the largest number of articles was Pubmed, followed by SciELO, IBECS and LILACS. The first stage of the analysis led to the exclusion of 40 articles that were duplicated. Subsequently, 528 articles were excluded, especially because they are association studies or for approaching the subject in a tangential manner. Of the 54 remaining articles to be read in full, 16 were excluded. These exclusions occurred, for example, because they were studies that only described a program to be implemented, or because they used interventions that presented only specific elements of *mindfulness*, ME or IE. Thus, a total of 38 articles made up the final *corpus* of this review. Figure 1 shows the flowchart of the study selection strategy, according to the PRISMA protocol.

The articles that make up this review are exclusively international and are written in the English language. The country with the largest number of publications was the United States (n=27; 71.0%), followed by Portugal (n=03; 7.9%), England (n=02; 5.2%), Australia (n=2; 5.2%), Holland (n=01; 2.6%), Canada (n=01; 2.6%), New Zealand (n=01; 2.6%), and Iran (n=01; 2,6%). The year with the

highest number of publication was 2017 (n=09; 23.7%), followed by 2016 (n=06; 15.8%). The years 2010, 2014, 2018 and 2019 contributed with four studies (10.8%) each year. The years 2011 and 2013 were the ones with the lowest number of publications, with only 01 article (2.7%) each year.

The sample size of the studies ranged from 10 (smallest sample) [9] to 194 (largest sample) participants. The surveys with the largest sample size[29-30] were derived from the same research protocol. Most of the studies were conducted with men and women (n=21; 55.2%); however, an important portion of the studies was carried out exclusively with women (n=17; 44.7).

It was observed that most of the studies (n=31, 81.6%) were carried out with overweight individuals, with 06 studies (15.8%) carried out with ED patients, and only 01 (2.6%) conducted with women with overweight and *binge eating*. Studies conducted with people with specific clinical conditions were few in number. Research studies were found with women with a current or previous history of cancer (n=03, 7.9%), with pregnant women (n=02, 5.2%), and with individuals in the postoperative period of bariatric surgery (n=01, 2.6%).

Regarding the type of study, most of the articles fall into the randomized type (n=21; 55.2%), followed by the evaluation of the participants before and after the intervention (n=13; 34,2%). The longest intervention lasted 6 months[31] and the shortest, one month[32-33]. The intervention time most commonly found in the studies was 8 weeks (n=08, 21.0%), followed by 10-week interventions (n=07, 18.4%). Most of the studies used the *mindfulness*-based intervention (n=18; 47.3%), followed by interventions that used *mindful eating* (n=11; 28.9%), *mindfulness* and *mindful eating* in association (n=5; 13.1%), and intuitive eating (n=04; 10.5%).

It is also important to mention that most of the research studies with a control group had an active control group (n=20; 52.6%), that is, the participants received some type of intervention that did not involve *mindfulness*, *mindful eating* or intuitive eating. Only 03 studies (7.8%) did not perform any type of intervention in the control group.

The results presented below will be organized based on the full reading of the studies that comprised the *corpus* of this review, aiming to answer the guiding question: (1) results of approaches centered on *mindfulness*, *mindful eating* and intuitive eating in the eating behavior; (2) results of approaches focused on *mindfulness*, *mindful eating* and intuitive eating in physical aspects; and (3) results of approaches centered on *mindfulness*, *mindful eating* and intuitive eating in psycho-emotional aspects.

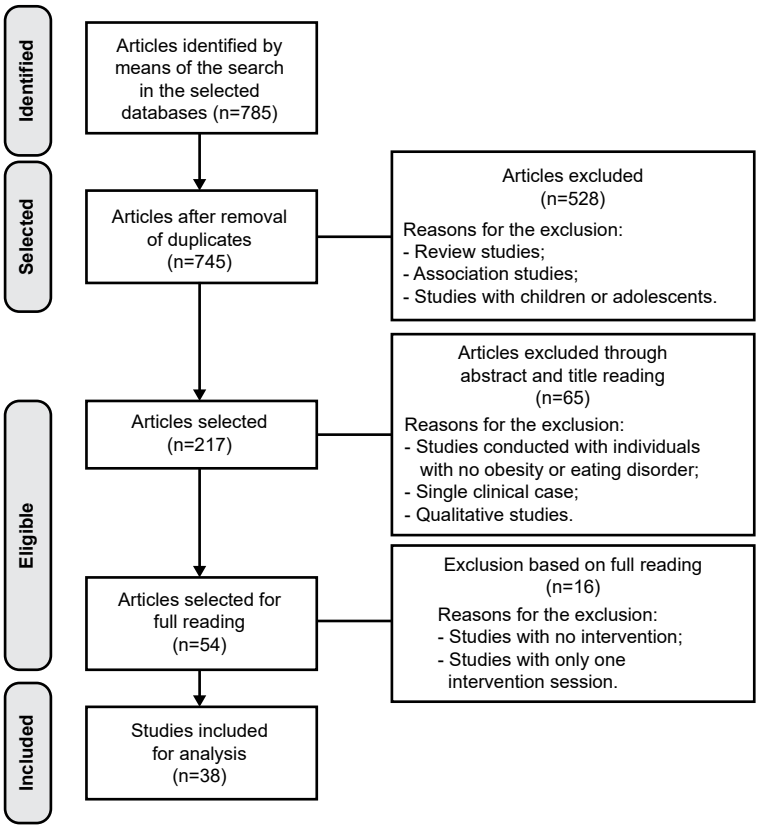

Figure 1 - Flowchart of the study selection process, prepared according to the PRISMA recommendations[27].

Category 1) Results of the approaches centered on mindfulness, mindful eating and intuitive eating in eating behavior.

Studies with overweight and obese subjects that had among their objectives improvements in eating behavior (55.3%) bring promising results. With interventions supported by *mindfulness*, ME or IE, reductions in *food craving* levels were observed, as well as in eating guided by external stimuli, emotional eating, eating guided by reward, episodes of compulsive eating and of *binge eating* compared to the control groups. For the interventions with evaluation of the before and after type, improvements were seen in eating awareness, reduction in binge eating episodes, increases in scores of *mindful eating* and intuitive eating, and improved fruit and vegetable intake. For the studies with ED patients (18.4%), a reduction in the number of episodes of *binge eating* was observed, as well as a reduction in the scores of the *Eating Attitudes Test* (EAT), an increase in the IE levels, and a decrease in the eating psychopathology levels after participating in the interventions (Figures 2 and 3).

Few studies (7.9%) found no differences between the experimental groups and the control group for the eating behavior parameters evaluated. For example, the study[34] that identified improvement in the levels of emotional eating, uninhibited eating, and symptoms of dependence on food in both groups of pregnant women (intervention and control), with no difference between them. It is important to note that the control group, in this study, also received an intervention, referred to as *Emotional Brain Training* (EBT), whose objective was to train the participants› emotional self-regulation, with a view to reducing their stress levels[34]. Similar results were obtained in another study[35], especially in reducing stress-related eating at the end of the intervention, in all the groups, with no difference between them. Also in this study, all the groups received some type of intervention, according to the following combinations: (1) stress reduction intervention based on *mindfulness* (*Mindfulness Based Stress Reduction* program), (2) stress reduction intervention based on the interrelationship between stress, food and well-being, supported by cognitive behavioral therapy, and (3) a combination of interventions from groups 1 and 2 (Figures 2 and 3).

Category 2) Results of the approaches centered on mindfulness, mindful eating and intuitive eating in physical aspects.

The research studies with interventions with evaluation of the before and after type, carried out with overweight individuals, obtained satisfactory results with regard to physical aspects, since the majority (66.7%) observed a significant reduction in weight, in the BMI and in the C-reactive protein levels. It is also worth mentioning that most of the randomized studies (72.7%), in which the participants were divided into an intervention group (*mindfulness* and *mindful eating*) and active control group (who received some type of intervention), found no significant differences between the groups for weight loss. However, there was a significant reduction in fasting glycaemia and in the TG/HDL ratio in the experimental group in relation to the control group[36] (Figure 3).

Regarding studies with ED patients, the results point to a reduction in concern about weight, physical shape and overvaluation of weight after participating in *mindfulness*-based interventions, compared to the control group. There was also an increase in body satisfaction, showing the benefits of such interventions for the participants.

Category 3) Results of the approaches centered on mindfulness, mindful eating and intuitive eating in psycho-emotional aspects.

Among the studies carried out with overweight and obese individuals, 27.0% had among their objectives the assessment of the impacts of *mindfulness*-based interventions on emotional and psychological aspects such as depression, anxiety, stress, psychological flexibility, and general mental health. These studies also bring promising results, since 80.0% of them identified an improvement in the parameters related to psychological distress, depression or anxiety[37-38].

The studies indicate that, after the intervention based on *mindfulness* and *mindful eating*, there was a significant reduction in the levels of depression, anxiety, perceived stress and cortisol [9,39-40]. In addition, some positive impacts were observed, such as an improvement in the ability to respond to bodily sensations, psychological flexibility and psychological acceptance, also described as a reduction in experiential avoidance[41-42] (Figure 2).

In studies conducted with individuals diagnosed with EDs, only 5.2% had among their objectives the assessment of the impacts of the *mindfulness*-based interventions on the emotional and psychological aspects. One of these studies was carried out with women with EDs[43], with a 12-week intervention integrating concepts of psychoeducation and *mindfulness,* where a significant reduction in psychological inflexibility, external shame and self-criticism was observed; as well as increased engagement with life, self-compassion, and levels of self-confidence and of *mindfulness*. It is important to note that these gains were maintained in reevaluations 3 and 6 months after the intervention.

In another study, also conducted with women with EDs[33], the authors performed a *mindfulness*-based intervention during four weeks and observed a reduction in the symptoms of depression and stress, as well as an improvement in psychological flexibility in relation to body image, when compared to the control group (Figure 2).

Title, authors, year and country of publication	Study type	Population evaluated (size for analysis)	Intervention type	Duration and components of the intervention	Mindfulness practices present in the intervention
Alberts et al. (2010) Netherlands[44]	Randomized intervention study: control and intervention groups	Adults with obesity (n = 19)	Mindfulness-based intervention	7 weeks. Group sessions (1h30) with formal practice at home	Body scan and Mindful breathing seated
Courbasson et al (2010) Canada[45]	Intervention study: comparison before and after	Adults with eating disorder and substance use (n = 38)	Mindfulness-based intervention associated with CBT *	16 weeks. Group sessions (2 hours) with formal practice at home	Mindfulness practice participants were encouraged to adopt a non-judgmental, non-striving and open mind stance.
Dalen et al (2010) USA[9]	Pilot intervention study: comparison before and after	Adults with obesity (n = 19)	Mindfulness-based intervention created for individuals with obesity and overweight (MEAL†)	6 weeks. Weekly group sessions (2 hours) with formal practice at home	Mindfulness meditation, mindful eating, awareness of body sensations and triggers to overeat.
Hepworth (2010) Australia(46)	Pilot intervention study: comparison before and after	Women with eating disorders (n= 33)	Outpatient care, with group activity	10 weeks. Group sessions (duration not informed) with formal practice at home	Mindful breathing seated and minduful eating
Daubenmier et al. (2011) USA[39]	Pilot randomized clinical study: control and intervention groups	Women with overweight and / or obesity (n = 47)	Intervention based on the MBSR‡; MBCT§ and MB-EAT‖ protocols	8 weeks. Group sessions (2,5 hours) and a retreat (7 hours) with daily and informal formal practice (6 days/week)	Mindful breathing seated; body scan; mindful yoga stretches, loving kindness meditations, the "3 minute breathing space" and ME¶ at meals
Anglin (2012) USA[47]	Randomized clinical study: control and intervention groups	Adults with obesity, sedentary, and without a history of chronic diseases (n = 16)	Intervention based on intuitive eating; and control group with caloric restriction	6 weeks	Not mentioned
Daubenmier et al. (2012) USA[38]	Pilot randomized clinical study: control and intervention groups	Women with overweight and / or obesity (n = 47)	Intervention based on the MBSR‡; MBCT§ and MB-EAT‖ protocols	8 weeks. Group sessions (2,5 hours) a retreat (7 hours) with daily and informal formal practice (6 days/ week)	Mindful breathing seated; body scan; mindful yoga stretches; loving kindness meditations, the "3 minute breathing space" and ME¶ at meals
Woolhouse et al. (2012) Australia[49]	Intervention study: comparison before and after	Women with eating disorders (n= 54)	Mindfulness-based intervention with CBT * association for eating disorder (MEG Program)	10 weeks. Group session (3 hours), and a follow-up session after 3 months	Sitting meditation; body scan and manegment feelings practice related to food.
Kidd et al. (2013) USA[50]	Intervention study: comparison before and after	Women with obesity (n= 12)	ME¶-based intervention	8 weeks. Group sessions (1 - 1h30)	Awareness practtice about of the senses and patterns without pressure to change; without judgment.
Corsica et al. (2014) USA[35]	Randomized clinical study: 3 groups	Women (98%) with overweight (n = 53)	Groups: (1) MBSR ‡; (2) CBT*; and (3) combined intervention	6 weeks. Group sessions (50 to 80 minutes) with formal and informal practice at home	Body scan; mindful breathing seated, mindful yoga stretches, loving kindness meditations, and informal practice
Daubenmier et al. (2014) USA[40]	Pilot randomized clinical study: control and intervention groups	Women with overweight and / or obesity (n = 47)	Intervention based on the MBSR‡; MBCT§ and MB-EAT‖ protocols	8 weeks. Group sessions (2,5 hours) and a retreat (7 hours) with daily and informal formal practice (6 days/week)	Mindful breathing seated; body scan; mindful yoga stretches; loving kindness meditations, the "3 minute breathing space" and ME¶ at meals
Kristeller et al. (2014) USA[11]	Randomized clinical study: control and intervention groups	Adults with overweight and / or obesity (n = 150)	Groups: (1) MB-EAT‖; intervention; (2) psychoeducational and cognitive-behavioral intervention; and (3) passive control group	9 weeks. Group sessions (1h30-2h) and 3 monthly reinforcements	Mindful breathing seated and and ME¶ at meals

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Mantzios et al. (2014) England[51]	Randomized clinical study: control and intervention groups	Adults with overweight and / or obesity (n = 152)	Mindful Attention and Awareness in both groups, one performed in a group and the other with individual practice	6 weeks. Group (2 hours) and individual sessions, with formal practice at home	Mindful breathing seated; and body scan
Asadollahi et al. (2015) Iran[52]	Randomized clinical study: 4 groups	Adults with obesity (n = 60)	Groups: (1) MBCT§; (2) nutritional orientation; (3) association of interventions 1 and 2; and (4) passive control group	8 weeks. Group sessions (2 hours) with formal practice at home	Tthe “3 minute breathing space” practice, body scan and stomach checking practice at meals
Stites et al. (2015) USA[32]	Randomized clinical study: intervention and late intervention groups	Adults with overweight and / or obesity (n =28)	ME¶-based intervention	4 weeks. Group sessions (1h30)	Not mentioned
Boucher et al. (2016) New Zealand[42]	Pilot intervention study: comparison before and after	Women with overweight (n= 40)	Intervention based on intuitive eating and associated with a psychological approach	14 weeks. 12 group sessions (15-20 minutes)	Not mentioned
Chacko et al. (2016) USA[53]	Randomized clinical study: control and intervention groups	Adults after bariatric surgery (1 to 5 years) (n = 18)	Intervention based on the MBSR ‡, MB-EAT‖, and Mindful Self-compassion (MSC) protocols	10 weeks. Group sessions (1h30) and a retreat (4 hours) with formal practice at home	Mindful breathing seated; loving kindness meditations, body scan and mindful yoga.
Chung et al. (2016) EUA[54]	Intervention study: comparison before and after	Women with overweight and a history of breast cancer (treatment completed at least 3 months) (n = 22)	ME¶-based intervention associated with dietary orientation for weight loss	12 weeks. Group sessions for 6 weeks	Mindful breathing seated; ME¶ at meals, body scan and mindful walking exercise,
Daubenmier et al. (2016 USA[36]	Randomized clinical study: control and intervention groups	Adults with obesity (n= 194)	Intervention based on the MBSR ‡, MBCT§ and MB-EAT‖ protocols	12 weeks. 16 group sessions (2-2h30), with formal and informal practice at home	Mindful breathing seated; mindful walking, exercise, loving Kindness meditations, yoga and ME¶ at meals
Lucas et al. (2016) USA[55]	Intervention study: comparison before and after	Women with overweight and / or obesity and cancer history (n = 17)	Mindfulness-based intervention and dietary orientation	8 weeks	Mindful breathing seated; and mindful yoga
Mason et al. (2016) USA[29]	Randomized clinical study: control and intervention groups	Adults with overweight (n= 194)	Intervention group: diet / exercise and mindfulness Control group: diet and exercise.	12 weeks. 16 group sessions (2-2h30), with formal and informal practice at home	Mindful breathing seated, mindful walking, loving kindness meditations and mindful yoga
Mason et al. (2016) USA[56]	Randomized clinical study: control and intervention groups	Adults with obesity (n= 194)	Mindfulness-based intervention. Control and intervention groups received nutritional and exercise orientation. (SHINE clinical trial).	12 weeks. 16 group sessions (2-2h30), with formal practice at home	Mindful breathing seated, mindful walking, loving kindness meditations and mindful yoga
Pinto Gouveia (2016) Portugal[43]	Intervention study: comparison before and after	Women with eating disorder and overweight (n = 31)	BEfree is a psychological program with psychoeducational strategies and new contextual-behavioral approaches, such mindfulness and self-compassion.	12 weeks. Group sessions (2h30)	Mindful breathing seated, and body scan
Adler et al.(2017) USA(30)	Randomized clinical study: control and intervention groups	Adults with obesity (n= 194)	Mindfulness-based intervention. Control and intervention groups received nutritional and exercise orientation. (SHINE clinical trial).	12 weeks. 16 group sessions (2-2h30)	Mindful breathing seated, mindful walking, loving kindness meditations and mindful yoga
Carpenter et al. (2017) USA[57]	Pilot randomized clinical study: control and intervention groups	Adults with overweight (n= 194)	Mindfulness-based intervention. Control and intervention groups received orientations about weight loss.	11 weeks. Telephone intervention (weekly, with a practice of 60 seconds)	Mindful breathing seated, and ME¶
Duarte et al. (2017) Portugal[33]	Pilot randomized clinical study: control and intervention groups	Women with eating disorder and overweight (n = 20)	Brief intervention based on mindfulness and compassion.	4 weeks. A group session (2h30) and 3 weeks of individual audio-guided practice	Mindful breathing seated, body scan, ME¶ and presentation of compassionates images

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Palmeira et al. (2017) Portugal[37]	Randomized clinical study: control and intervention groups	Women overweight and / or obese (n = 52)	Intervention based on MB-EAT‖, acceptance and compassion therapy.	10 weeks. Group sessions (2h30) and 2 additional reinforcement sessions every 3.5 months, with formal practice at home	Loving kindness meditations, ME¶ and mindful breathing seated
Raja-Khan et al. (2017) USA[38]	Randomized clinical study: control and intervention groups	Women overweight and / or obese (n = 86)	MBSR‡	8 weeks. Group sessions (2h30) and a retreat (6 hours), with formal practice at home	Not mentioned
Richards et al.(2017) USA[58]	Pilot intervention study: comparison before and after	Women with eating disorder (n= 120)	Program based on the 10 principles of Intuitive Eating	10 weeks. Individual sessions	Not mentioned
Spadaro et al. (2017) USA[31]	Pilot randomized clinical study: control and intervention groups	Adults with overweight (n= 46)	Intervention based on the MBSR ‡ and MB-EAT ‖ associated with calorie restriction and physical exercise orientations.	6 months. Group sessions (1-1h30)	Body scan and mindful breathing seated, three minutes *check-in*, loving kindness meditations and ME¶
Kristeller et al. (2018) USA[59]	Randomized clinical study: control and intervention groups	Adults with obesity (n= 117)	MB-EAT‖ intervention group	10 weeks. Group sessions (2h30) with 2 reinforcement sessions (2 hours)	Mindful breathing seated, ME¶ at meals, body scan and e Forgiveness meditation.
Laraia et al.(2018) USA[34]	Non-randomized clinical study: control and intervention groups	Pregnant woman (12–19 gestational weeks) with overweight and / or obesity (n = 46)	Intervention based on MBSR ‡; MBCT§, and MB-EAT‖	8 weeks. Group sessions (2 hours)	Mindful breathing seated, loving kindness meditations and compassion meditation
Mason et al. (2018) USA[60]	Intervention study: comparison before and after	Adults with overweight (n= 104)	ME¶-based intervention	28 days. Individual session (5-10 minutes) with daily telephone call	Mindful breathing seated and ME¶
Vieten et al. (2018) USA[41]	Intervention study: comparison before and after	Pregnant women with overweight (8 - 20 gestational weeks) (n = 110)	Intervention based on MBSR ‡; MBCT§, and MB-EAT‖	8 weeks. Group sessions (2 hours), with formal practice at home	Mindful breathing seated, mindful walking, loving kindness meditations and body scan.
Cole et al. (2019) USA[61]	Pilot intervention study: comparison before and after	Adults with overweight and/or obesity (n= 56)	Intervention based on the principles of intuitive eating (My Body Knows When program - MBKW)	10 weeks. Group sessions online and in person (1h30)	Not mentioned
Hanson et al. (2019) United Kingdom[62]	Pilot randomized clinical study: control and intervention groups	Adults with grade 3 obesity (n = 33)	Mindfulness-based intervention. Control group: individuals who did not complete the intervention.	8 weeks. Group sessions every 2 weeks (1h30)	Not mentioned
Stice et al. (2019) USA[63]	Randomized clinical study: control and intervention groups	Women with eating disorder (n = 84)	Mindfulness-based intervention. Control group: Body Project eating disorder –BPT.	8 weeks. Group sessions (1 hour)	Not mentioned
Thomas et al. (2019) USA[64]	Randomized clinical study: control and intervention groups	Women with overweight and / or obesity and history of cancer (in remission or active) (n = 51)	Mindfulness-based intervention associated with CBT elements * and positive psychology principles. Both groups received nutritional counseling.	10 weeks. Group sessions (1h30), with formal practice at home	Not mentioned

*CBT = Cognitive behavioral therapy; †MEAL = Mindful Eating and Living; ‡MBSR= Mindfulness - Based Stress Reduction; §MBCT= Mindfulness - Based Cognitive Therapy; ‖MB-EAT = Mindfulness – Based Eating Awareness Training; ¶ME = Mindful Eating

Figure 2 - Summary of the analysis of the included articles: description of the sample, type and duration of the intervention explored, Ribeirão Preto, SP, Brazil, 2019

Title, authors, year and place of publication	Instruments applied	Outcomes/Parameters assessed	Results found
Alberts et al. (2010) Netherlands[44]	*General Food Craving Questionnaire Trait*	(a) weight; (b) food cravings; (c) hours of daily practice	The experimental group participants reported significantly lower food cravings after the intervention.
Courbasson et al (2010) Canada[45]	*Structured Clinical Interview for DSM-IV disorders; Eating Disorder Examination Questionnaire;* BDI*	(a) number of compulsive eating episodes; (b) number of compulsive eating days	Reduction in the number of compulsive eating episodes reported. Fewer concerns about shape, weight and diet over time.
Dalen et al (2010) USA[9]	BES†; BDI*; PSS§; TFEQ‖*;* KIMS¶; *Beck Anxiety Inventory*	(a) changes in weight and BMI‡; (b) eating behavior; (c) psychological stress; (d) physiological stress markers	Increased measures of awareness around eating, and reductions in weight, compulsive eating and depression. There was a reduction in the C-Reactive Protein.
Hepworth (2010) Australia[46]	EAT**-26	Disordered eating symptoms	Reductions were found in all the subscales of **EAT-26.
Daubenmier et al. (2011) USA[39]	KIMS¶; DEBQ††	(a) level of full attention, (b) eating behavior, (c) weight, abdominal fat and (d) response to cortisol	Increased attention and responsiveness to bodily sensations, reducing anxiety and emotional eating.
Anglin (2012) USA[47]	Did not apply a specific instrument	(a) weight; (b) waist circumference; (c) BMI‡	There was weight loss or maintenance in both groups. Total weight loss was greater in the calorie restriction group.
Daubenmier et al. (2012) USA[38]	PSS§; DEBQ††; KIMS¶ *e; Block Food Frequency; State-Trait Anxiety Scale-Trait Form;*	(a) psychological distress; (b) eating behavior; (c) metabolic parameters (d) telomerase activity	Both groups had an increase in telomerase activity.
Woolhouse et al. (2012) Australia[49]	DEBQ††; *Eating Disorders Inventory-3 Symptom Checklist; Multifactorial Assessment of Eating Disorders Scale; Eating Self-Efficacy Scale; Emotional Overeating Questionnaire; Cognitive and Affective Mindfulness Scale-Revised*	Frequency and severity of compulsive eating events	Significant reduction in the frequency and severity of compulsive eating and dissatisfaction with body image.
Kidd et al. (2013) USA[50]	*20-item Weight Efficacy Lifestyle Questionnaire*; *28-Mindful Eating Questionnaire (*MEQ*); 20-item Center for Epidemiologic Studies-Depression Scale*	(a) depressive symptoms; (b) weight, height, body composition, blood pressure, (c) lifestyle; (d) level of *;* Mindfull eating (ME)	There was an increase in self-efficacy for weight loss and eating habits.
Corsica et al. (2014) USA[35]	PSS§-10; *Eating and Appraisal Due to Emotions and Stress Questionnaire; Emotion- and Stress-Related Eating subscale*	(a) perceived stress; (b) stress-related eating and (c) weight loss	The combined intervention resulted in greater reductions in perceived stress and produced short-term weight loss.
Daubenmier et al. (2014) USA[40]	DEBQ††; BES†; *Body Responsiveness Questionnaire*	(a) level of full attention, (b) emotional eating (c) weight, abdominal fat and (d) cortisol	Higher levels of cortisol were related to greater emotional and restrictive food intake, and to lower interoceptive awareness.
Kristeller et al. (2014) USA[11]	BES†; TFEQ‖; *Power of Food Scale; Rosenberg Self-Esteem*	(a) compulsive eating; (b) food intake; (c) craving for a certain type of food; (d) depression; (e) self-esteem; (f) BMI‡	After the intervention, 95% of the individuals in the mindful eating group no longer met the eating disorder criteria; against 76% receiving the other intervention.
Mantzios et al. (2014) England[51]	*Mindful Attention and Awareness Scale; Barratt Impulsivity Scale; Cognitive-Behavioral Avoidance Scale;*	(a) weight; (b) attention and awareness; (c) impulsivity	The group intervention produced greater weight loss. The individual intervention increased the rates of mindfulness and reduced impulsivity for food.
Asadollahi et al. (2015) Iran[52]	SCL‡‡-90-r	(a) psychiatric symptoms; (b) BMI‡, weight and height	The combined intervention had a greater impact on the participants' weight loss compared to performing the interventions alone.
Stites et al. (2015) USA[32]	MEQ§§	(a) weight and ; (b) metabolic parameters	The intervention produced a reduction in the consumption of calories and fat at lunch compared to the late intervention.
Boucher et al. (2016) New Zealand[42]	*Intuitive Eating Scale (*IES-1*); Disorder Examination-Screening Version (EDE-S); Acceptance and Action Questionnaire-II; Short Form 12-item Health Survey*	(a) BMI‡; (b) intuitive feeding; (c) compulsive eating; (d) psychological flexibility; (d) mental health	Increased scoring on intuitive eating, psychological flexibility and mental health scales. And reduction in compulsive eating.
Chacko et al. (2016) USA[53]	TFEQ‖*-R1; Quality of life (QOL)*	(a) weight; (b) eating behavior; (c) compulsive eating; (d) metabolic parameters	The intervention was effective in reducing emotional eating.
Chung et al. (2016) USA[54]	MEQ§§	(a) weight and BMI‡; (b) levels of mindful eating	Significant increase in the level of mindful eating and weight and *BMI reductions.

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Title, authors, year and place of publication	Instruments applied	Outcomes/Parameters assessed	Results found
Daubenmier et al. (2016 USA[36]	*9-item Reward-based Eating Drive* PSS§-10;	(a) weight and height, (b) blood pressure; (c) waist circumference; (d) fasting blood glucose lipid profile	Improvement of blood glucose parameters and lipid profile of the intervention group at 12 and 18 months.
Lucas et al. (2016) USA[55]	*Five Facet Mindfulness Questionnaire (*FFMQ*); Mindfulness Attention Awareness Scale* MAAS*; Food Habits Questionnaire); Physical Activity Questionnaire; Physical Performance Battery; Pittsburg Sleep Quality Index.*	(a) level of mindfulness; (b) quality of the diet; (c) quality of life; (d) physical activity; (e) sleep	There was an increase in the level of mindfulness, consumption of fruits and vegetables, and in the quality of sleep after the intervention.
Mason et al. (2016) USA[29]	PSS§-10; *9-item Reward-based Eating Drive (RED) scale*	(a) weight loss; (b) food reward mechanisms	The mindfulness group presented lower levels for the RED scale.
Mason et al. (2016) USA[56]	MEQ§§	(a) level of mindfulness; (b) consumption of sweets; (c) fasting blood glucose	The intervention group showed greater increases in Mindfulness levels immediately after and maintained 12 months later. The control group showed an increase in the consumption of sweets between 6 and 12 months after.
Pinto Gouveia (2016) Portugal[43]	BES†; FFMQIIII *; Acceptance and Action Questionnaire-II; Cognitive Fusion Questionnaire-Body Image; Engage Living Scale; Forms of Self-Criticising/Attacking & Self-Reassuring Scale; Self-Compassion Scale*	(a) disordered eating behavior and attitudes; (b) psychological inflexibility	Reduction of compulsive eating and eating psychopathology, psychological inflexibility, cognitive fusion of body image, external shame and self-criticism. There was an increase in engagement with valued life, levels of self-compassion, confidence and mindfulness.
Adler et al.(2017) USA[30]	FFMQIIII *e Pittsburgh Sleep Quality Index*	(a) sleeping quality; (b) level of mindfulness	Both groups showed improvements in sleep quality, especially with the highest scores in FFMQIIII .
Carpenter et al. (2017) USA[57]	BES†; MEQ§§; FFMQIIII–*Short Form; Patient Health Questionnaire-2.*	(a) eating behavior; (b) level of mindfulness; (c) level of mindful eating; (d) weight	Improved scores for mindful eating, eating behavior, acceptance and psychological flexibility related to weight.
Duarte et al. (2017) Portugal[33]	BES†; FFMQIIII*; Body Image Shame Scale; 21□item Depression, Anxiety, and Stress Scale; Cognitive Fusion Questionnaire for food craving; Body Image Acceptance and Action Questionnaire; 22-item Forms of Self□Criticism and Self□Reassurance Scale;*	(a) disturbed behaviors; (b) body image; (c) depression and stress symptoms; (d) BMI‡	The intervention reduced symptoms of eating disorder, depression and stress, as well as indicators of psychopathology, overvaluation of weight and shape. There was an improvement in psychological flexibility in relation to body image.
Palmeira et al. (2017) Portugal[37]	*Weight self-stigma Questionnaire; Obesity Related Well-Being Questionnaire; Obesity Related Well-Being Questionnaire*	(a) emotional eating; (b) self-stigma with body image; (c) eating behavior; (d) BMI‡, waist circumference and cholesterol levels	The intervention group showed a significant decrease in weight self-esteem, emotional and uncontrolled eating and increased quality of life vs. control.
Raja-Khan et al. (2017) USA[38]	*Toronto Mindfulness Scale; Perceived Stress Scale-10; Short Form-36; Brief Symptoms Inventory-18.*	Biochemical parameters: glucose, insulin, C-reactive protein, glycated hemoglobin and cortisol.	The intervention group showed a significant reduction in perceived stress, fasting glycaemia after 8 and 16 weeks versus baseline, which was not seen for control.
Richards et al.(2017) USA[58]	¶¶IES; EAT**; *Body Shape Questionnaire*; *Outcome Questionnaire (OQ).*	(a) eating behavior and intuitive eating; (b) perception of body image; (c) weight	There was an improvement in the scores of **EAT, ¶¶IES and *Body Shape Questionnaire.*
Spadaro et al. (2017) USA[31]	MAAS***; *Eating Behavior Inventory; Block Food Frequency Questionnaire; Paffenbarger Habits*	(a) weight; (b) behavior and food intake; (c) level of mindfulness	Both groups had weight loss, reduced food intake and increased food restriction levels. The results were more intense in the intervention group. Uninhibited eating and perception of hunger decreased in both groups after the intervention, with no difference between them.
Kristeller et al. (2018) USA[59]	BES†; BDI*-II; FFMQIIII; *Functional Assessment of Chronic Illness Therapy – Spiritual Well-Being Scale*	(a) eating disorder symptoms; (b) symptoms of anxiety and depression	The anxiety, depression and eating disorder scores decreased in the mindful eating group.
Laraia et al.(2018) USA[34]	*Cohen's Perceived Stress Scale;* DEBQ††; *Pregnancy-Related Anxiety Scale; Patient Health.*	(a) perceived stress; (b) eating behavior; (c) depression and anxiety symptoms	Reduction in stress, pregnancy-related anxiety and depression, and emotional eating in both groups.
Mason et al. (2018) USA[60]	*Food Craving Questionnaire - Trait – Reduced; Reward-based Eating Drive Scale; Palatable Eating Motives Scale.*	(a) eating guided by the reward; (b) reasons for eating palatable foods; (c) engagement with the practices; (d) weight	There was a reduction in reward-related eating and eating for social reasons.

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Title, authors, year and place of publication	Instruments applied	Outcomes/Parameters assessed	Results found
Vieten et al. (2018) USA[41]	FFMQ‖‖; MEQ§§; PSS§; *Acceptance and Action Questionnaire; Emotion Regulation Questionnaire; Patient Health Questionnaire.*	(a) mindfulness and mindful eating level; (b) psychological acceptance and flexibility; (c) perceived stress and signs of depression	There was an increase in the score of mindful eating and mindfulness, in flexibility and psychological acceptance. Improved levels of perceived stress and depression.
Cole et al. (2019) USA[61]	¶¶IES-2; *Motivation for Eating Scale.*	(a) level of intuitive eating; (b) weight and BMI‡	Significant increase in the scores of social eating, emotional eating, unconditional permission to eat and confidence in the signals of hunger and satiety. There was a significant reduction in BMI‡
Hanson et al. (2019) United Kingdom[62]	*Whole person integrative eating questionnaire*	(a) eating behavior; (b) weight	Significant improvement in eating behavior and greater immediate and sustained weight loss over 6 months.
Stice et al. (2019) USA[63]	*20-item Thin-Ideal Internalization Scale; 10-item Thin-Ideal Affirmation Dissonance Scale; 17-item Satisfaction and Dissatisfaction with Body Parts Scale; Positive Affect and Negative Affect Scale—Revised; Eating Disorder Diagnostic Interview*	(a) eating disorder criteria; (b) eating behavior	In the 6-month follow-up, 77% of the BPT††† participants failed to attend the diagnosis of eating disorder versus 60% of the mindfulness group.
Thomas et al. (2019) USA[64]	DEBQ††; *Multidimensional Assessment of Interoceptive Awareness; Ways of Savoring Checklist.*	(a) interoceptive awareness; (b) eating behavior; (c) natural responsiveness to rewards	The intervention produced an increase in the rates of interoceptive awareness, the ability to respond naturally to rewards, and a greater reduction in external eating behaviors.

*BDI = *Beck Depression Inventory*; †BES = *Binge Eating Scale;* ‡BMI = BMI= Body Mass Index; §PSS = *Perceived Stress Scale;* ‖TFEQ = *Three-Factor Eating Questionnaire;* ¶KIMS = *Kentucky Inventory of Mindfulness Skills;***EAT-26 = *Eating Attitudes Test–26;* ††DEBQ = *Dutch Eating Behavior Questionnaire;* ‡‡SCL-90-R: *Symptom Checklist-90-Revised;* §§MEQ = Mindful Eating Questionnaire*;* FFMQ‖‖ = *Facet Mindfulness Questionnaire;* ¶¶IES = *Intuitive Eating Scale;****MAAS = Mindfulness Attention Awareness Scale*;* †††BTB = *Beatman Performance Training*

Figure 3 - Summary of the analysis of the included articles = parameters analyzed and main results found, Ribeirão Preto, SP, Brazil, 2019

Discussion

This study aimed to conduct an integrative review of the growing number of research studies that investigated the role of interventions based on *mindfulness*, *mindful eating* and intuitive eating in the approach of overweight, obesity and EDs, especially with regard to the eating behavior and to the physical and psycho-emotional aspects. Through the studies evaluated, it was observed that such interventions had a positive impact on the eating behavior and on the emotional and psychological aspects of the participants; and also, to some extent, on the physical aspects, with regard to weight loss and the improvement of metabolic parameters.

Eating behavior is defined[65] as attitudes related to the eating practices associated with intrinsic socio-cultural attributes of the individual or belonging to a community, which are involved with the act of eating or with food itself. In this perspective, far beyond than just dealing with the practices involved with food (which, how much, how, where and with whom we eat), the eating behavior involves subjective aspects around food, which can be socio-cultural or psychological.

In the light of this concept, it is clear that interventions focused especially on ME and IE meet what is part of the human eating behavior, since they value and consider not only the biological aspects, related to "what and how much we eat", but also encompass the psychosocial, emotional and environmental aspects that pervade food. Among its principles, the reconnection with the internal signals of hunger and satiety stands out, and eating guided especially by this signaling, minimizing food intake in response to emotional or environmental factors[66]. It is worth noting that these interventions do not focus on changing the foods that the individual consumes, but rather on understanding the relationship that the individuals have with food, and on how the mind and body understand the experience of eating[67]. In a special way, ME also advocates the non-judgment and non-segmentation of foods into "good and bad", helping the subjects to understand the reasons for their food choices, leaving the automatic pilot, with openness and kindness[66].

From this discussion, it is observed that the results of the interventions observed in the studies in relation to the eating behavior are related to the fundamentals of *mindfulness*, ME and IE. Attention, presence and non-judgment in relation to food, and the recognition of internal signs of hunger and satiety, are aspects that favor more flexible food choices and more consistent with this signaling, minimizing excessive eating and eating guided by emotional and/or environmental factors, which reverberates positively in relation to food and to the eating behavior[12,14-19].

The recognition and appreciation of the role of emotions in our eating, strongly advocated by these interventions, have an important role in improving the eating behavior of the subjects, especially for the emotional aspect with emphasis on negative emotions, to be considered a primary determinant of overeating episodes[68-69]. Recognizing and welcoming the negative emotions in a gentle and compassionate manner, based on the observation of the experience itself, without judgment or criticism, can avoid eating disorders and the impulse to suppress these feelings through food[10]. The results of the studies agree with this premise, since improvements were obtained in emotional eating, eating guided by external factors, episodes of overeating and *binge eating*.

In addition, studies on women with EDs have also reported improvements in the eating practices, in relation to food and in the acceptance of the body image; as well as reduced emotional eating. These results signal the positive emotional and physical impacts which may result from programs that incorporate and value the principles of ME and IE, making weight loss no longer the only focus/reason for happiness[9].

Although some studies have carried out their interventions in order to achieve weight reduction, it is important to keep in mind that approaches centered on *mindfulness*, *mindful eating* and intuitive eating do not have this objective. The improvements in the relationship with eating and food, and the benefits obtained in the eating behavior that are advocated in these approaches, can consequently lead to weight reduction, even though this is not their focus.

Greater attention to internal and external signals that regulate food intake, eating more slowly, feeling satisfied with a smaller volume of food, and better control of psychological impulses without using food to satisfy psychological/emotional needs, can lead weight loss in this process, even though this is not the purpose of the intervention[70]. From this perspective, the results of the studies that did not observe the superiority of *mindfulness*, ME and IE for weight loss should not be interpreted as negative.

Following diets that focus on calorie restriction has been the most widely used strategy for weight loss for several decades[71]. However, evidence accumulates in the literature indicating the inefficiency of diets for weight loss, as well as for the maintenance of this loss, in the medium and long terms[2-3]. Multiple compensatory mechanisms are involved in the process of recovering the weight that is lost with the practice of diets; with emphasis on the intense disconnection with the internal signaling of hunger and satiety, since the decision of what and how much to eat is transferred to external rules, generating profound negative repercussions on the eating behavior of those on diets[72-73].

In this sense, the dietary behavior of dieters is cognitively controlled, and it is always necessary to verify that food intake is in accordance with the external rules imposed by the diet. The disconnection with the physical sensations of hunger and satiety ends up deregulating the eating behavior of the subjects, making dieters more fragile to environmental, psychosocial and emotional influences in eating, generating frequent episodes of overeating and emotional eating[73-74].

Bearing in mind that, contrary to what is recommended by the diets, one of the main objectives of the ME and IE approaches lies in promoting improvements in the eating behavior, especially through a reconnection with the internal signs of hunger and satiety, non-judgment and non-categorization of foods as "permitted and prohibited", and in encouraging health care by taking the focus off body weight, the contradiction in the use of these approaches with the objective of weight loss is clear.

An important point to be considered in relation to the studies concerns the variability of the intervention protocols used, which makes it difficult to replicate them and to compare the results. It is noteworthy that the studies, in general, did not inform aspects inherent to the professionals who conducted the interventions, such as education, training in *mindfulness* and the clinical experience with the population and the practices employed. In addition, based on the types of studies analyzed and their results, an interest emerges in the experiential dimension of the participants submitted to *mindfulness*-based interventions, signaling the relevance of studies that qualitatively analyze the subject's experience in their own repertoire of meanings.

Despite the interest in interventions based on *mindful eating* and intuitive eating is growing, the years of the publications signal that these interventions are a recent phenomenon. Most of the published studies focus on the years 2016 and 2017, and the oldest year of publication is 2010. It is worth noting the fact that 100.0% of the studies that make up the *corpus* of this review are international, indicating that, although these interventions are being widely discussed and used, the number of countries producing on the subject is still small; in addition, no published studies on approaches in Brazil were found in the studied databases. This note raises the need for caution in generalizing these findings to all populations, especially to individuals living in very diverse cultures, since the human eating behavior reflects interactions between the physiological and psychological state and the external environment in which it is inserted[75].

The great scarcity of studies in the national setting points out to the need to develop studies on this theme in the country, in order to advance in relation to its understanding, given that these interventions seem to be effective strategies to assist, not only in the good relationship of individuals in relation to eating, but also to avoid dysfunctional eating behaviors.

Final Considerations

The studies that make up the present review offer a range of information on the role of the interventions centered on *mindfulness*, ME and IE and on addressing overweight, obesity and EDs. Their results suggest that such interventions bring benefits to the subjects, especially with regard to the eating behavior and to the psychoemotional aspects. These results are in line with the basic principles of these interventions, more specifically for ME and IE, which are strongly supported in the appreciation of the internal signs of hunger and satiety as the main guide for eating, as well as in openness and non-judgment in relation to food, which can minimize episodes of emotional eating and overeating; besides helping to reduce the levels of stress and anxiety, especially when related to eating and food.

Even though it is not the objective of interventions based on *mindfulness*, ME and IE, several studies have used them in order to achieve weight loss in overweight individuals. Analyzing the *corpus*, it is observed that the interventions were not superior, in relation to the control, for this objective; which, *a priori*, can be interpreted as a negative outcome. However, if we interpret these results in the light of the basic objectives of the ME and IE approaches, we realize that these objectives are aligned, which prioritize helping the subjects not to lose weight, but to establish a healthy relationship with food.

The absence of studies in the Brazilian scenario brings to the fore the need to advance studies on this topic in the country, considering the promising results obtained in the eating behavior and emotional health of individuals with overweight and EDs. The subjects who live with such health conditions present impairments in their mental health and dysfunctional eating behaviors, both of which are a source of great suffering and reduced quality of life. Advancing in relation to the understanding of the theme can enhance the approaches, especially nutritional ones, commonly used in these conditions. In addition, it can also strengthen this field of knowledge in the country, expanding the discussions and reflections on new and promising possibilities in approaching overweight, obesity and EDs, which should even permeate the professional training of those who will deal with these subjects.

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Author's Contribution

Study concept and design: Marina Rodrigues Barbosa and Fernanda Rodrigues de Oliveira Penaforte. Obtaining data: Marina Rodrigues Barbosa and Fernanda Rodrigues de Oliveira Penaforte. Data analysis and interpretation: Marina Rodrigues Barbosa, Fernanda Rodrigues de Oliveira Penaforte and Ana Flavia De Sousa Silva. Statistical analysis: Marina Rodrigues Barbosa, Fernanda Rodrigues de Oliveira Penaforte and Ana Flavia De Sousa Silva. Drafting the manuscript: Marina Rodrigues Barbosa, Fernanda Rodrigues de Oliveira Penaforte and Ana Flavia De Sousa Silva. Critical review of the manuscript as to its relevant intellectual content: Marina Rodrigues Barbosa.

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Corresponding Author:
Marina Rodrigues Barbosa
E-mail: marinarbarbosarb@gmail.com
https://orcid.org/0000-0001-7502-243X