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Healthy Lifestyle Deck of cards as a tool for cognitive-behavioral therapy in adults with obesity

Baralho do Estilo de Vida como ferramenta da terapia cognitivo-comportamental de adultos com obesidade

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Abstract

Objective

This is a mixed-methodology controlled clinical study that assessed the effect of the Healthy Lifestyle Deck of cards as a Cognitive-Behavioral Group Therapy tool for obese adults.

Method

The sample was divided into two groups: Intervention group and Intervention+Deck. The therapy was interdisciplinary handled by psychology, nutrition and physical education professionals, along 12 sessions. The following measures were performed: anthropometric assessment, indicators of binge eating, depression, anxiety and stress, quality of life, self-efficacy for eating habits, and physical activity at the beginning and the end of the intervention. Participants' written and verbal reports' content was analyzed.

Results

The results were: a reduction in body mass, binge eating, and improvement of self-efficacy to regulate eating habits in both groups. There was an improvement in the psychological domain of quality of life only in the Intervention+Deck group.

Conclusion

The study concluded that the intervention favored participants' cognitive and behavioral changes.

Keywords: Cognitive behavioral therapy; Coping skills; Interdisciplinary research; Obesity.

Resumo

Objetivo

Este estudo clínico controlado de metodologia mista avaliou o efeito do Baralho do Estilo de Vida como ferramenta da Terapia Cognitivo-comportamental em grupo de adultos com obesidade.

Método

A amostra foi dividida em dois grupos: grupo Intervenção e grupo Intervenção+Baralho. A terapia foi interdisciplinar com profissionais da psicologia, nutrição e educação física e foram realizadas 12 sessões. As avaliações realizadas foram: avaliação antropométrica, indicadores de compulsão alimentar, depressão, ansiedade e estresse, qualidade de vida, autoeficácia para hábito alimentar e atividade física no início e no fim da intervenção. Foi realizada análise de conteúdo dos relatos verbais e por escrito dos participantes.

Resultados

Neste sentido, verificou-se redução da massa corporal, da compulsão alimentar e melhora da autoeficácia para regular o hábito alimentar nos dois grupos. Houve melhora no domínio psicológico da qualidade de vida apenas no grupo Intervenção+Baralho.

Conclusão

O estudo concluiu que a intervenção favoreceu mudanças cognitivas e comportamentais dos participantes.

Palavras-chave: *Terapia cognitivo-comportamental; Estratégias de enfrentamento; Pesquisa interdisciplinar; Obesidade.*

Physical inactivity and inadequate food consumption are among the death risk factors of Chronic Noncommunicable Diseases identified by the World Health Organization (WHO) (Ministério da Saúde, 2020). According to the latest survey carried out in Brazil, the frequency of overweight is 55.4%, slightly higher among men, and that of adults with obesity is 20.3%, similar between genders. Obesity is a chronic disease associated with excessive accumulation of body fat: the disease has a complex and multifactorial etiology, resulting from the interaction of genetic, psychological, emotional and lifestyle factors (Souza et al., 2015).

Interdisciplinary therapy appears in the literature as a reference for the treatment of obesity by promoting changes in nutritional habits, sedentary behavior and weight loss (Moraes, Cipullo, et al., 2019; Poli et al., 2017). Cognitive-behavioral therapy (CBT) has proven to be an intervention modality that can help patients achieve weight loss, reducing dysfunctional behaviors, focusing on cognitive processes, modifying unrealistic expectations of weight loss and negative perceptions of self-image. Such therapy helps to improve skills such as self-monitoring (Castelnuovo et al., 2017). An increase in the perception of quality of life is also observed, especially in individuals who have become accustomed to the practice of physical activity and use coping strategies (Phelan et al., 2020). The WHO defines Quality of Life as “the individuals’ perception of their position in life, within the framework of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns” (Fleck, 2000, p. 34).

The use of coping strategies in CBT is an important resource in the behavior change process, as indicated in the literature (Herrero et al., 2018; Jones et al., 2018; Lores et al., 2020). However, studies are scarce on the use of decks or coping cards.

In the CBT clinical practice, when a distorted belief or dysfunctional behavior is identified, a card can be prepared in a note format with one or several words or may form a sentence that helps the patient to expand the behavioral repertoire and make dysfunctional thoughts addressed in the session more flexible. It is suggested that patients place the coping card in a visible place at home or at the workplace so that, when observing its content, the individual remembers something important or reflects on the aspect highlighted on the card. The reminder must remain exposed

until cognitive flexibilization or until the expansion of the patient's behavioral repertoire occurs (Beck, 1997).

In this perspective, the clinical study presented here intended to evaluate the effect of the Healthy Lifestyle Deck of cards in anthropometric measures, depression indicators, anxiety, stress, binge eating, in domains of quality of life and self-efficacy to regulate eating habits and physical activity in adults with obesity. It was also intended to identify the participants' cognitive and behavioral changes through their verbal and written reports. As this is a mixed methodology clinical study, its findings can contribute to the development of interdisciplinary interventions for individuals with obesity, since it portrays a treatment modality that can be reproduced in public and private health services, as well as favoring public policies in the area.

The contribution to the professional practice of cognitive-behavioral therapists also justifies the relevance of this study, since it is intended to demonstrate the use of the Deck as a therapeutic resource, revealing its applicability in clinical practice.

Method

The inclusion criteria in the set-up of two groups of 8 to 15 participants, included: Body Mass Index (BMI: kg/m²) between 30 and 39.99: kg/m²; age between 30 and 60 years, both genders; availability to attend meetings. The initial sample consisted of 28 participants, of which one was excluded because he had previously participated in clinical studies; one was also excluded because he had already undergone bariatric surgery and three were excluded because the BMI did not correspond to the research inclusion criteria. Twenty-three adults were considered eligible and all interviews and assessments took place face-to-face. In the initial interview, the weight and height of the participants were measured to confirm the inclusion criteria. Each participant was interviewed individually based on a semi-structured script. Participants considered eligible were divided, for convenience, into two groups according to their time availability to participate in the intervention, and had no prior knowledge of the allocation.

Both groups participated in the Cognitive-Behavioral Therapy in an interdisciplinary group, with the participation of a nutritionist (session 3) and a physical education professional (session 5). In the first and last sessions, an anthropometric assessment and reapplication of the instruments were performed. The BMI was calculated by dividing weight by height squared and neck, waist and hip circumferences were measured using a measuring tape (Moraes, Pisani et al., 2013). The R Software was used to perform the statistical analysis (R Core Team, 2020). In assessing the data normality, the Shapiro-Wilk test was used. To verify whether there was a group effect and the assessment of anthropometric and instrumental measurements, the ANOVA model with repeated measures and the Bonferroni POST HOC method of multiple comparisons were used. To assess the Effect Size (ES), in relation to the baseline and final assessments of both groups, the Hedges' g estimate was calculated, which provides a bias correction for Cohen's d for a small sample (Cohen, 1988).

The analysis of verbal and written reports was developed based on the content analysis proposed by Minayo (2012). Understanding constitutes the central element in the qualitative analysis, which seeks to consider the uniqueness, experiences and life story of the individual that occur within the scope of collective history and that are contextualized and involved by the culture of the group in which they are inserted (Minayo, 2012).

The study was approved by the Ethics and Research Committee of UNIFESP (CAAE: 08314219.0.0000.5505, under appraisal nº 3.316.383). Participation in the study was formalized

by the signing of the Free and Informed Consent Form by all volunteers. The study is registered in the Brazilian Registry of Clinical Trials RBR-554pws and the universal trial number of this study is U1111-1254-3992.

Participants

In the Cognitive-Behavioral Group Therapy (CBGT), 10 women with a mean age of 46.75 years ($SD \pm 8.5$) participated in the intervention. As for BMI, in the initial assessment, the participants had grade I obesity ($n = 6$) and grade II obesity ($n = 4$). Twelve people participated in the CBGT+ Deck group, three men and nine women; they had a mean age of 39 years ($SD \pm 6.32$). As for BMI, in the initial assessment, the participants were overweight ($n = 1$), grade I obesity ($n = 4$) and grade II obesity ($n = 7$). It is noteworthy that the data analysis presented in this study refers only to the participants who performed the assessment at the beginning and end of the CBGT intervention ($n = 8$) and CBGT+Deck ($n = 8$).

Instruments

Depression, Anxiety and Stress Scale (DASS-21): Validated for Portuguese by Vignola and Tucci (2014); it evaluates the emotional states of depression, anxiety and stress. The result is obtained by adding the item scores for each of the three subscales multiplied by two. Depression: Normal/Mild (0–9), Minor (10–13), Moderate (14–20), Severe (21–27) and Very Severe (28+); Anxiety: Normal/Mild (0–7), Mild (8–9), Moderate (10–14), Severe (15–19) and Very Severe (20+); Stress: Normal/Light (0–14), Mild (15–18), Moderate (19–25), Severe (26–33) and Very Severe (34+).

Binge Eating Scale (BES): Validated for Portuguese by Freitas et al. (2001), it is an instrument consisting of a list of 16 items from which the statement that best represents the individual's response must be selected. Each statement corresponds to a number of points from 0 (absence) to 3 (maximum severity) of Binge Eating Disorder (BED). The final score is the sum of the points for each item. Scores less than or equal to 17 are considered to have no BED; between 18 and 26, moderate BED; and greater than or equal to 27, severe BED.

WHOQOL-bref: Validated into Portuguese by Fleck et al. (2000), it assesses individuals' perceptions of Quality of Life in the framework of their culture and value system, their personal goals, concerns, and standards. The short version comprises 26 items that measure the expanded domains: physical health, psychological health, social relationships and environment, classifying the perception of quality of life as: needs improvement, regular, good or very good.

Self-efficacy Scale to regulate Physical Exercise and Self-efficacy Scale to regulate Eating Habits: Translated and validated into Portuguese by Boff (2012) in which they are asked to indicate the strength of the degree of confidence to stick to a diet and maintain a physical exercise routine. On a scale of 0 (not at all confident); intermediate confidence levels 50 (moderately confident); up to completely confident 100 (highly confident). For categorization of the total scores, the average of responses is taken into account, with the following classification: low self-efficacy from 0 to 49 points; average 50 to 79 points and high 80 to 100 points.

Lifestyle Deck: Elaborated by the first author, it is a resource used only with the CBGT+Deck group. It is an instrument based on the CBT technique called coping cards. As described by Beck (1997), this resource is used in the practice of CBT and the content of the cards can be developed for use in specific problematic situations and to compose self-instructions to motivate the patient. The deck contains 49 cards divided into 04 groups: alerts, reflections, tips and permissive thoughts

regarding the consumption of highly palatable foods that are common in overweight and obesity, as postulated by Beck (2009). The cards content also addresses the principles described in the Food Guide for the Brazilian Population regarding the ten steps to healthy eating (Ministério da Saúde, 2014). The instructions contained in the deck explain that the cards must be placed in visible places in settings frequented by the individuals and aim to draw their attention to their content, serving as support for the cognitive and behavioral change addressed during the sessions.

Procedures

With both groups, 12 consecutive weekly sessions were held lasting 1 hour and 15 minutes each. As shown in Table 1, the sessions were structured and adapted according to the model proposed by Beck (2009); Neufeld et al. (2014); Castelnuovo (2017); Moraes, Padovani, et al. (2021). Considering that obesity is a multifactorial disease and requires a multidisciplinary approach (Fernández-Ruiz et al., 2020; Mendes et al., 2016), an interdisciplinary intervention proposal was developed. Both groups had a meeting with a nutritionist (session 3), who addressed aspects of nutritional education based on the Food Guide for the Brazilian Population (Ministério da Saúde, 2014), and with Physical Education professionals (session 5), who addressed the importance of the practice of physical activity and proposed a practice of functional exercises adapted to the participants.

Table 1

Structure of the Cognitive-Behavioral Group Therapy and Cognitive-Behavioral Group Therapy+Deck intervention program

Nº	Theme – CBGT and CBGT+Deck
01	Presentation of the research, dynamic presentation of the team and participants, application of instruments
02	Psychoeducation on the cognitive-behavioral model and how to identify environmental triggers for eating; use of food diary
03	Session with the nutritionist (Guidelines based on the Food Guide for the Brazilian Population) (Brasil, 2014)
04	Use of CBT techniques: Socratic Questioning, Problem Solving, Positive Enhancement of desirable behaviors; use of food diary
05	Session of Physical Educators (importance of regular physical activity and practice of functional exercises)
06	Use of CBT techniques: Role Play and Assertiveness Training, Problem Solving, positive enhancement of desirable behaviors
07	Use of CBT techniques: Psychoeducation and Decision Making, time management strategies, positive enhancement of desirable behaviors
08	Psychoeducation about anxiety, fear and stress and use of CBT techniques such as Socratic Debate
09	Breathing practice, relaxation and mindful eating (Salvo et al., 2018)
10	Dynamics about saboteur/permissive diet thoughts. Use of sentences written in the CBT group and the deck in the CBGT+Deck group
11	Continuation of the dynamic on saboteur/permissive thoughts. Use of sentences written in the CBT group and the deck in the CBGT+Deck group
12	Relapse prevention: survey of risk situations and coping strategies.; application of instruments; closing dynamics

Note: CBGT: Cognitive-Behavioral Group Therapy; CBGT+Deck: Cognitive-Behavioral Group.

In the second meeting, each of the participants in the CBGT+Deck group received a Healthy Lifestyle Deck of cards with instructions on how to use it. Just like in the CBT clinical practice, the participants of this group were instructed to place daily the cards in visible places so that, based on their visualization, they would promote cognitive flexibility and the expansion of the participants' behavioral repertoire (Beck, 1997). The use of the Healthy Lifestyle Deck of cards differs from other interdisciplinary therapeutic interventions because it is a physical resource, easy to handle, which can be used both in group sessions and in the patient's daily life.

During all sessions there was the presence of a therapist in both groups who was in charge or organizing the agenda and group interventions and a co-therapist who provided support for the interventions and performed a detailed record of the participants' verbalizations in a field diary. At the end of the sessions, the therapist and co-therapist met and analyzed the relevant points

observed during the session. Weekly, the therapist and co-therapist participated in supervisions with a specialist professional in the area of Cognitive-Behavioral Therapy.

Two groups were created on WhatsApp® to provide information on the meeting agenda, encourage participation in sessions, forward preparatory psychoeducational videos, encourage bonding between participants and justify absences. The sessions agenda was programmed in advance according to the objectives of the session for the best use of time and maintenance of the treatment focus. At the end of the meetings, the participants filled out a “session feedback” form in which they recorded their relevant perceptions about the session’s contribution to the behavior change process.

As group management strategies, the following were used: food diary for self-monitoring (sessions 01 to 05), psychoeducational videos on the cognitive-behavioral model (session 01) and on anxiety (session 8), diaphragmatic breathing training, progressive muscle relaxation and mindful eating (session 9) (Salvo et al., 2018). There was also assertiveness training using the role play technique, in which participants practiced the skill of refusing food offered by staging ways of saying “no thanks” to the highly palatable food they intended to refuse (session 6). In this technique, two participants are chosen who act out how to refuse food offered assertively, without the discomfort of displeasing the other party. In the following session, time management and sleep hygiene strategies were developed (session 7). Regarding the work with dysfunctional, saboteur or permissive thoughts, with regard to food, group dynamics were carried out in the CBT group and in the CBGT+Deck group, the green-purple cards from the Healthy Lifestyle Deck of cards were used, which address permissive thoughts and diet saboteurs on the front and a coping suggestion on the back (sessions 10 and 11). Aiming to stimulate the regular practice of physical activity, after the session with the physical educators, the therapist arranged a walk on the beach with both groups (session 5).

Results

As shown in Table 2, the statistical analysis showed that CBGT produced a reduction in body mass ($\Delta\text{CBGT} = -4.73 \pm 4.22$ and $\Delta\text{CBGT+Deck} = -1.45 \pm 2.76$, $p = 0.003$), BMI ($\Delta\text{CBGT} = -1.77 \pm 1.57$ and $\Delta\text{CBGT+Deck} = -0.83 \pm 1.39$, $p = 0.002$), anthropometric measures of neck circumference ($\Delta\text{CBGT} = -1.56 \pm 1.88$ and $\Delta\text{CBGT+Deck} = -0.63 \pm 0.83$, $p = 0.006$), the result of the Binge Eating Scale (BES) ($\Delta\text{CBGT} = -9.88 \pm 7.43$ and $\Delta\text{CBGT+Deck} = -7.50 \pm 4.57$, $p < 0.001$); improvement of quality of life indicators in the physical domains ($\Delta\text{CBGT} = 0.27 \pm 0.62$ and $\Delta\text{CBGT+Deck} = 0.39 \pm 0.47$, $p = 0.02$), social relationships ($\Delta\text{CBGT} = 0.25 \pm 0.43$ and $\Delta\text{CBGT+Deck} = 0.42 \pm 0.59$, $p = 0.013$), environment ($\Delta\text{CBGT} = 0.27 \pm 0.56$ and $\Delta\text{CBGT+Deck} = 0.37 \pm 0.27$, $p < 0.001$) and Scale of Self-efficacy to regulate Eating Habits ($\Delta\text{CBGT} = 10.50 \pm 16.30$ and $\Delta\text{CBGT+Deck} = 15.97 \pm 18.48$, $p = 0.04$) regardless of the group. There was a reduction in the measurement of hip circumference only for the CBT group ($\Delta\text{CBGT} = -4.63 \pm 4.02$, $p = 0.050$) and an increase in the quality of life indicator in the Psychological Domain only for the CBGT+Deck group ($\Delta\text{CBGT+Deck of Cards} = 0.62 \pm 0.29$, $p = 0.019$ Effect size 1.91 large) (Neter et al., 1996).

After skimming the text, followed by the systematic review of verbal and written reports, the units of analysis were inferred. Subsequently, the data were grouped and categorized (Minayo, 2012). Three categories emerged: reflections on changing behaviors; difficulties to change behaviors; behavior changes.

Table 2*Averages of final assessments, differences between initial and final assessments and effect size of anthropometric and instrumental variables*

Variables	CBGT Mean Final Ass. (SD)	Δ CBGT (SD) (n = 8)	ES values	CBGT+Deck Mean Final Ass. (SD)	Δ CBGT+Deck (SD) (n = 8)	ES values	p-value
Anthropometric							
Body mass (kg)	88.69 ± 7.58	-4.73 ± 4.22	1.00	94.53 ± 8.01	-1.45 ± 2.76	0.47	0.003
BMI (kg/m ²)	33.58 ± 3.53	-1.77 ± 1.57	1.00	33.59 ± 3.43	-0.83 ± 1.39	0.53	0.002
Neck circumference (cm)	36.69 ± 3.51	-1.56 ± 1.88	0.74	36.94 ± 2.74	-0.63 ± 0.83	0.67	0.006
Hip circumference (cm)	118.63 ± 8.08	-4.63 ± 4.02	1.02	121.31 ± 8.80	-0.69 ± 3.66	0.17	0.005
Instrumentals							
BES	9.13 ± 6.13	-9.88 ± 7.43	1.18	9.75 ± 3.69	-7.50 ± 4.57	1.46	< 0.001
Physical D.	3.60 ± 0.86	0.27 ± 0.62	0.39	3.89 ± 0.53	0.39 ± 0.47	0.73	0.020
Psychol. D.	3.31 ± 0.66	0.11 ± 0.51	0.18	3.79 ± 0.36	0.62 ± 0.29	1.91	0.015
Social relationship	3.37 ± 1.06	0.25 ± 0.43	0.52	3.79 ± 0.82	0.42 ± 0.59	0.63	0.015
Environ-ment	3.55 ± 0.70	0.27 ± 0.56	0.42	4 ± 0.21	0.37 ± 0.27	1.25	< 0.001
S.Ef. eating habits	59.42 ± 19.25	10.50 ± 16.30	0.57	62.69 ± 17.29	15.97 ± 18.48	0.77	0.04

Note: Δ: difference between initial and final means. p-value < 0.05.

BES: Binge Eating Scale; BMI: Body Mass Index; CBGT: Cognitive-Behavioral Group Therapy; ES: Effect Size; Physical D.: Physical Domain; Psychol. D.: Psychological Domain; S.Ef.: Self Efficacy.

In the category reflections on changing behaviors, the reports showed the participants' awareness and motivation about the need to change attitudes in connection with food choices and physical activity practice:

I love to find an excuse for my slips. (...). When I did all the exaggeration of the weekend, my criticism was: "wow, aren't you on a promise? Why did you abuse? Why did you lick the "brigadeiro" pan? (...). (P.4, session 4- CBGT)

By reading those cards I was able to review how I am leading my life. I realized that I need to radically change my lifestyle. (P.18, blue card - CBGT+Deck)

The cards are helping me a lot, especially when I randomly pick some cards from the deck. They were my company during that week. (P.18, green and purple card - CBGT+Deck)

I'm already questioning myself before I eat. It is a great help, because before I did not question myself about it. (P.21, green-purple card - CBGT+Deck)

In the category 'difficulties to change behaviors', obstacles to change were perceived in everyday life, involving issues related to health, daily stresses and family and cultural characteristics, as can be seen in the following reports:

My mother doesn't like to make salad, (...). I had to summon myself, the food is for you to eat and you will have to arrive ten minutes earlier and prepare your own salad. (P.5, session 7- CBGT)

When I was eating the fittest cake, I was paying attention to what I was eating. On those days I was so spaced out that I wasn't paying attention to what I was doing, when I realized I had already finished eating. (P.17, session 4- CBGT+Deck).

In the 'behavior changes' category, the participants demonstrated more assertiveness in relationships, in the ability to refuse food offered and facing the possibility of displeasing other people from the negative:

But that's where our thoughts are worth. Resisting is our psychology. If it was a while ago I would have already taken a fork, try it. I didn't do that because I stopped to think that I wasn't hungry (P.2, session 6- CBGT).

This week I stopped to eat because of one of the cards (Avoid distractions when eating) and I put it in my fridge (P.21, session 4- CBGT+Deck).

There's a card that I try to keep always visible, which is: 'your body doesn't know what a weekend is', because then you take Friday, Saturday and Sunday. (...) I'm learning to keep the balance! (P.17, session 9- CBGT+Deck).

Discussion

Obesity is a chronic disease, involving multiple determinants (psychological, social, environmental, genetic), which has an economic impact and an impact on the public health system. From this perspective, the literature has pointed out interventions of an interdisciplinary nature as the most effective ways to manage obesity (Bevilaqua et al., 2016; Evangelista et al., 2019; Fernández-Ruiz et al., 2020; Leite et al., 2017; Moraes, Padovani et al., 2021). The non-drug interdisciplinary intervention constitutes important evidence for the treatment and prevention of overweight, obesity and their comorbidities, improving the quality of life and reducing the risk of mortality in this population.

The positive outcomes of multi- or interdisciplinary treatments are related to patient adherence and engagement in lifestyle changes that involve physical activity and a balanced diet (Mendes et al., 2016). It is recognized that the high costs of interdisciplinary treatments require more accessible alternatives for the treatment of the disease. From this perspective, this study seeks to fill that gap as it presents a proposal for a brief intervention using a support tool that is easy to access and manage. Publications suggest carrying out quanti-quali studies in patients with obesity from the perspective of integrating variables and thus improving understanding of the complexity of their disease (Evangelista et al., 2019). However, few studies were published addressing a mixed methodology, which makes it difficult to discuss their findings (Ulian et al., 2018).

After the statistical analyses of the present study, it was observed that the perception of quality of life in the psychological domain improved significantly for the CBGT+Deck group at the end of the intervention. Questions related to this domain address negative and positive feelings, body image, self-esteem and satisfaction with appearance. The impact of obesity on body image, sense of well-being, sexuality, experience of isolation and prejudice, as well as physical impairment caused by the disease are discussed (Leite et al., 2017; Phelan et al., 2020; Ulian et al., 2018). In this connection, improvement in the participants' perception of quality of life in the psychological domain who used the Healthy Lifestyle Deck of cards was considered a relevant finding of this study.

As a tool management strategy, participants in the CBGT+Deck group were instructed to place the Lifestyle Deck of cards in visible places so that their attention would be directed to its content, as well as the use of coping cards in clinical practice. Although no publications were found that reported clinical studies using decks of cards as a tool, recent studies have shown that modifying the attentional bias is a strategy used in cognitive training of overweight and obese patients (Dalle Grave et al., 2020; Moraes, Padovani et al., 2021).

Cognitive training can be administered via computer or portable device, considered more practical than traditional behavior change treatment. However, it is important to highlight that it is essential that the intervention is intermediated by a health professional (Jones et al., 2018). As well as the use of deck of cards, studies show that in the treatment of overweight or obese individuals techniques are employed that use specific stimuli to draw attention, such as visual tasks exhibited in places associated with food. Jones et al. (2018) point out that training with specific inhibitory control cues is also used, such as associating images of food with the word "stop" or with the red light of a traffic signal. Improving the capacity of reflexive processes is considered fundamental in the treatment of obesity because it involves the development of inhibitory control strategies, which corresponds to the ability to stop, modify or delay the response that is not appropriate, which is considered the key in the self-control process. Strategies are also indicated to maintain the weight loss goal, especially when the individual is faced with a food of great enhancing value for him (Jones et al., 2018).

Another randomized clinical study showed that performing cognitive training improved brain executive functions such as attention, cognitive flexibility, decision-making and task planning, aspects that favor weight loss and better control of impulsivity (Muñoz Galindo et al., 2019).

Because it is an easy-to-handle physical resource, the present study demonstrated that the Healthy Lifestyle Deck of cards can be applied both in group and in individual interventions. Another aspect worth mentioning is that the material can continue to be used by the individual after the end of the intervention, helping rescuing the work aspects of the sessions. As can be seen, the proposed deck is presented as a therapeutic resource in the process of self-monitoring and maintenance of the new cognitive and behavioral pattern.

Despite presenting limitations regarding the statistical analysis because a sample calculation was not performed, a decrease in body mass and BMI was observed, with a larger effect size in the CBGT. This data can be explained due to the fact that the CBT group had a greater reduction in body mass compared to the CBGT+Deck group ($\Delta\text{CBGT} = -4.73 \pm 4.22$ and $\Delta\text{CBGT+Deck} = -1.45 \pm 2.76$, $p = 0.003$). This enhances the importance of educational health actions in changing behavior among overweight and obese individuals.

Data referring to binge eating, perception of physical domains, social relationships and environment of quality of life and self-efficacy to regulate eating habits showed that the effect size was greater in the CBGT+Deck group. The reduction in hip measurement was significant only for the CBGT.

Regarding the classification of the severity of binge eating, it is noteworthy that in the CBT group in the initial assessment, one participant had severe compulsion symptoms, four had moderate compulsion and three had no compulsion symptoms. At the end of the intervention, one had moderate compulsion and seven had no compulsion symptoms, demonstrating a significant reduction. In the CBGT+Deck of cards group, in the initial assessment, one participant had severe compulsion, three moderate compulsion, and four did not show compulsion. At the end of the intervention, the eight participants did not show symptoms of compulsion.

It is known that CBT is traditionally recognized as the best treatment for binge eating and the most used intervention in the treatment of obesity (Castelnuovo et al., 2017; Dalle Grave et al., 2020; Moraes, Padovani et al., 2021). It is considered as the first line of psychological approaches in the treatment of overweight and obesity, especially in the long term perspective. Maintaining therapeutic gains is one of the main challenges for health professionals and researchers who study obesity (Castelnuovo et al., 2017; Moraes, Padovani et al., 2021).

The literature in the area demonstrates a clear relationship between lifestyle and obesity (Fernandez-Ruiz et al., 2020). Interventions focused on changing lifestyle that use specific weight control strategies were associated with improved quality of life, especially in individuals who practiced physical activity and used more psychological coping strategies (Phelan et al., 2020). Recent studies have shown that personal strengths are required in coping with chronic diseases, such as a sense of self-efficacy and persistence, as well as having support from family, friends, peers and health care, and among self-management strategies, being active, knowing how to plan and prioritize, reduce stress, have goals, seek knowledge and help (Kristjansdottir et al., 2018). Thus, the improvement in self-efficacy to regulate the eating habits of both groups can also be pointed out as another relevant finding of this study.

With regard to mental health, the literature also demonstrates that obesity and depression have a two-way association. Individuals with depression are more likely to gain weight due to food choices high in fat, sugar, and sodium and reduced physical activity. Anxiety also plays an important

role in eating behavior, as it can cause relief and avoidance of negative emotions. According to a recent study by Moraes, Padovani, et al. (2021), symptoms of depression and anxiety are the result of cognitive distortions. It is believed that interdisciplinary therapy can favor flexibility and adaptation of cognitive patterns, mitigating psychological suffering and producing effective behavioral changes (Moraes, Cipullo et al., 2019).

The psychological effects of obesity involve body dissatisfaction, low self-esteem and the presence of symptoms associated with depression (Lores et al., 2020). Although in the CBT group one participant had a diagnosis of anxiety disorder and one of depression and in the CBGT+Deck group two participants had a diagnosis of anxiety disorder, the intervention did not provide significant changes in the indicators of depression, anxiety and stress of the participants of both groups. Considering that self-efficacy for practicing physical activity was the variable that suffered the least impact from the intervention in both groups, it can be inferred that interventions that provide the practice of supervised physical activity in a group can favor participants' adherence and regularity (Moraes, Cipullo et al., 2019; Moraes, Padovani et al., 2021; Poli et al., 2017).

Regarding the strategies used during the intervention, the food diary was used as a task aimed at self-monitoring the food consumed throughout the week, corroborating the literature (Phelan et al., 2020). The study that used the immediate recording of the consumption of highly palatable foods in everyday situations found that people who habitually consume highly palatable foods are more likely to use this strategy to deal with stress (Ulian et al., 2018).

The participants' verbal and written reports complemented and expanded the understanding of the quantitative results. Bonding between the participants and the professional team was considered essential for the development of a therapeutic environment favorable to change and overcoming the difficulties encountered. It was observed that the intervention created favorable conditions for participants' cognitive and behavioral changes in both groups which demonstrated increased awareness and motivation to change their lifestyle necessary in the treatment of obesity.

The experience of sharing lived situations, difficulties and achievements contributed to the change in the participants' way of thinking and acting in relation to food and physical activity. The difficulties reported by the participants and the perception of the risk of being overweight can cause to health were also associated with changes in behavior. Thus, cognitive and behavioral changes could be verified in verbal and written reports. Participants in both groups talked about aspects they would like to change in themselves (category reflections on changing behaviors), mentioned identifying problems and difficulties with changing lifestyle (category difficulties changing behaviors) and expressed about concrete changes in relation to eating habits and practice of physical activity (behavior change category).

Thus, it can be stated that the improvements in the quantitative parameters are explained by the qualitative analysis. Changes in eating behavior and sedentary behavior can be exemplified in the reports of participants who mentioned:

Just yesterday I walked, there are 5 floors, I walk up. If I can go up and down walking I will (...). I think after the group I'm more concerned. When I go to the market I remember the nutritionist saying, this is not an ultra-processed food. (P.7, session 7- CBGT)

And on using the Deck as support for change:

This week I stopped to eat because of one of the cards ("Avoid distractions when eating") and I posted it on my fridge. (P.21, session 4- CBGT+Deck)

The scientific literature demonstrates that the success of the long-term treatment of obesity is related to maintaining a healthier lifestyle, as well as engaging in physical activity programs that

promote increased energy expenditure, eat better quality of food and use longer time dedicated to exercises. We highlight the choice of less processed foods, consuming more fruits and vegetables, maintaining energy homeostasis, seeking a negative energy balance. Phelan et al. (2020) reinforce that in those who practiced strategies to maintain body weight, an increase in the perception of quality of life was also observed, especially among those who developed the habit of exercising and who used cognitive and behavioral strategies learned during interventions for coping of everyday problem situations. The improvement in quality of life can also serve as a motivation for maintaining weight loss and maintaining it in the long term (Phelan et al., 2020).

Conclusion

This study demonstrated that supportive therapeutic resources such as the Healthy Lifestyle Deck of cards can stimulate self-monitoring, improve the perception of quality of life and serve as support for cognitive and behavioral changes in individuals with obesity. The results indicate that the cards can be used as homework during cognitive-behavioral therapy, helping to improve body composition and providing long-term therapeutic gains, since they serve as “reminders” of how to think and act functionally after the end of the intervention. Aiming to deepen the effects found, it is suggested to carry out interventions that use coping cards with a larger number of participants. Future interventions envisage the possibility of evaluating how the deck as a coping strategy can be a validated instrument in everyday life, identifying the time of use and effectiveness in changing the behavior of those who use it in adopting a healthy lifestyle.

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Contributors

V. P. ALMEIDA was responsible for the conception, design of the study, analysis and interpretation of data, review and approval of the final version of the article. D. A. CARANTI, supervisor, and R. C. PADOVANI, co-supervisor, contributed to the preparation of the study design, analysis and interpretation of results, review and final approval. A. S. MORAES and M. S. OLIVEIRA contributed to the interventions of the groups, in the elaboration of the study design and in the final approval of the article.