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Review

Hypnotherapy for overweight and obese patients: A narrative review

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ABSTRACT

Obesity and overweight problems are serious global health issues today and despite many efforts, the prevalence has continued to rise for decades. Interestingly, hypnotherapy has been gaining recognition as an effective treatment for obesity and overweight problems. This review compiles contemporary scientific research on the effectiveness of hypnotherapy for weight reduction. Scopus, PubMed and EBSCO Host databases were applied in the study. The search identified 119 articles, of which seven met the inclusion criteria. A total of 539 respondents (82.7% women and 17.3% men) between the ages of 17 and 67 years were represented in the seven studies. Most studies incorporated lifestyle changes, such as changes of dietary habit and behavioral recommendations in the hypnotic procedure. Their results suggested that the use of hypnotherapy not only promoted weight reduction during the treatment period but also after treatment cessation, and in some cases, one to ten kilograms were lost during follow-up periods. In addition, one study even showed increased physical activity among the hypnotised individuals. This use of hypnotherapy also improved respondents' eating behavior and quality of life. However, a definitive conclusion could not be drawn due to several methodological flaws and the limited number of published studies in this area. Therefore, further well-designed studies are needed to substantiate the effectiveness of hypnotherapy for this modern-day health problem.

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1. Introduction

Overweight and obesity are characterized by metabolic disorders that are due to body fat accumulation accompanied by a body mass index (BMI) greater than or equal to 25 or 30 kg/m^2, respectively; these disorders are becoming major worldwide health problems. The prevalence of obesity and overweight has increased globally, especially in developed countries. Globally, in 2016, 39% of adults aged 18 years and older were overweight and more than 650 million were obese [1]. These conditions have been linked to an increased risk for developing non-communicable diseases, such as cardiovascular diseases, diabetes and psychosocial illnesses, like eating disorders, depression and low self-esteem [2,3]. Overweight and obesity are also linked with decreased quality of life [4,5] and increased morbidity and mortality [6,7]. Consequently, these health problems have resulted in a growing economic burden on healthcare systems, particularly due to the hospitalizations and drug prescriptions for obesity-related conditions [8].

Various strategies have been implemented to combat obesity and overweight conditions, especially through reduction in energy intake and increased physical activity. However, these conventional weight loss programs have often proven ineffective for a long-term maintenance, and almost 70% of participants regain at least half of their lost weight after the intervention [9]. In addition, Ramos Salas [10] found that excessive dietary interventions could even lead to physical and mental health disorders, including eating disorders, body dissatisfaction and suicide. Nonetheless, the notoriously poor compliance with common strategies has increased the demand for effective, safe and acceptable therapeutic options.

Among many interventions, hypnotherapy has gained increasing attention as an emerging complementary and alternative therapy. Hypnotherapy, or hypnosis, refers to "a state of consciousness involving focused attention and reduced peripheral awareness characterized by an enhanced capacity for response to the suggestions given" [11]. During a hypnotic session, an individual would be given suggestions to encourage changes in their behavior or relief of symptoms, for example, to achieve a healthy weight and maintain it [12,13]. Hypnosis also could be considered to be a mindfulness therapy, as it helps to increase the ability to control emotional impulses, such as the control of acute and chronic pain, support during labor and smoking cessation [14–17].

Although the literature has generally identified hypnotherapy as a useful adjuvant for weight loss, its effectiveness remains unclear and has not been scientifically replicated. It is also one of the least-researched therapies, and the evidence is limited due to duration of the intervention and its long-term effectiveness. The objective of the current review is to present the existing scientific evidence for the effectiveness of hypnotherapy for weight reduction, and to evaluate hypnotherapy's overall impacts.

2. Methods

This review was conducted following the preferred reporting items for systematic reviews and meta-analyses guidelines [18]. The articles incorporated were published in English from 1985 to April 2019 and were returned from searches of the Scopus, PubMed and EBSCO Host databases. The literature search used various combinations of keywords and terms related to the use of hypnotherapy for weight loss, based on the thesaurus, dictionaries and previous research. The search terms used included "hypnotherapy" OR "hypnosis" OR "self-hypnosis" AND "weight loss" OR "weight reduction" AND "obesity" OR "obese" OR "overweight" OR "weight problem."

Studies that used hypnotherapy approaches alone or in combination with behavior therapy to reduce weight were included in this review. Reviews, conference abstracts, letters, commentaries and case studies were also excluded. There were no limitations on the length of the included studies. Additional articles were selected from references used in the included studies, relevant reviews and previous meta-analyses. All articles included in the review were written in the English language, available in full-text form and published in peer-reviewed journals.

All titles and abstracts of studies returned by database searches were screened and reviewed following the inclusion criteria to eliminate duplicates and unrelated articles. Subsequently, the full-text of each included article was evaluated based on the following information. 1) objective: the effectiveness of hypnotherapy to weight loss; 2) characteristics of study: study design, respondents' age and sample size; 3) intervention process: length of intervention, follow-up; 4) targeted outcomes: weight loss; 5) major overall findings.

3. Results

The initial database search and subsequent evaluation of references identified 137 articles, including 27 duplicates. After screening the title and abstract of these documents for relevance, the full text of 56 articles was retrieved. Forty-nine articles were excluded because they did not fulfil the study selection criteria. A total of seven full-text papers met the eligibility criteria and were included in this review. These papers included data from 539 respondents (82.7% women and 17.3% men). The flow diagram of study selection is shown in Fig. 1. The articles were published between 1985 and 2018 and included three randomized controlled trials [19–21], one three-arm quasi-experimental study [22] and three quasi-experimental studies with a pre-post-test control group design [23–25].

Most studies were conducted in Europe [19–21], two in the United States of America [22,25], and the remaining studies were conducted in Canada [24] and Indonesia [23]. Participant recruitment was conducted via newspaper advertisements for three studies [20,24,25], from clinics in two studies [22,23] and from hospitals in another two studies [19,21].

Four studies recruited only obese individuals [19–21,23] while three studies recruited overweight and obese individuals [22,24,25], and participants in all studies ranged from 17 to 67 years of age. Sample sizes varied greatly among the studies, from as small as 22 to as large as 120 participants. The duration of the intervention varied between five weeks and twelve months. In one study, participants were followed for two years [25].

No studies used the same hypnotherapy procedures with regard to duration or whether it was delivered individually or in groups. The following methods were used: a nine-week program with eating rules given during hypnotic sessions [25], the use of audiotapes after hypnotic sessions with hypnotherapists [24], nutrition counseling during hypnotic sessions with specific food aversion [21–23], combination of hypnosis, behavioral therapy and hypnosis with acupressure for 12 sessions [20] and a rapid induction technique added to standard care [19]. Four studies observed the outcomes of self-hypnosis during a follow-up session, whereas another three studies only reported the results of hypnosis treatment with hypnotherapist.

All of these studies investigated the effectiveness of hypnotherapy for weight loss with variations in hypnosis procedures. All interventions incorporated eating and dieting rules during the hypnosis sessions except for one study, which used a combination of hypnosis and behavioral therapy as well as acupressure after the hypnosis [20]. Each of the studies assessed the difference in weight loss after the intervention as their primary outcome. One study also measured changes in levels of physical activity as an outcome

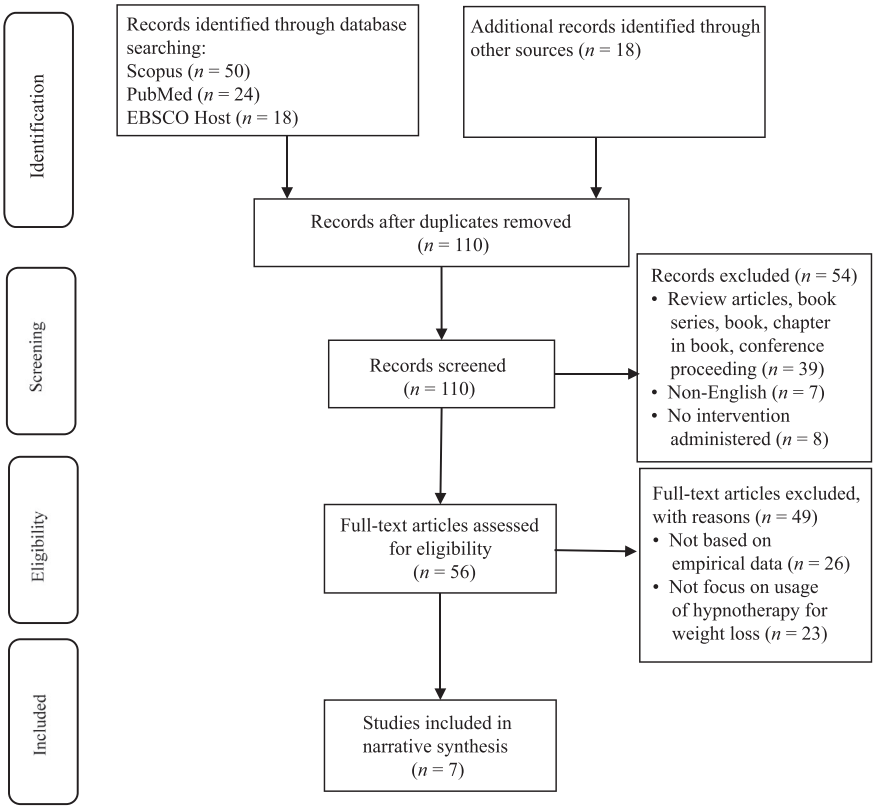

Fig. 1. Flow diagram of selection of studies.

[23]. Bo et al. [19] also included body fat percentage, waist circumference, quality of life and health status as treatment outcomes.

All studies reported positive effects on the weight-related outcomes and showed significant reduction at post-intervention follow-ups, compared to their controls. Two of these studies showed continued reductions at six-month follow-ups [20,24] and one study showed reduction at a two-year follow-up [25]. Further, all studies also showed significant reduction in dietary intake and improved eating behaviors, compared to the post-intervention control groups. One study even detected increased physical activity in the intervention group compared to the control; however, they did not follow up with the patients for further analysis [23]. All included studies are summarized in Table 1.

4. Discussion

The studies in this review suggest that hypnotherapy can offer beneficial effects for weight reduction, as an adjunctive therapeutic technique. However, the number of published studies is relatively small, and they each have methodological limitations. Thus, there is room for improvement in this field of study. All of the studies included here examined the effectiveness of hypnotherapy among overweight and obese participants, enabling the researchers to test its efficacy as a treatment for weight management. However, studies had relatively low sample sizes, ranging from 22 to 156 participants, as well as other methodological weaknesses. Further, as most of the respondents were recruited from hospitals and clinics, the study samples may not have represented the general population. According to Grave et al. [26], difficulties in recruiting and retaining study participants is a common problem for weight management programs, due to issues like time constraints and lack of motivation. This factor affects patient participation and clearly reduces the power of the investigations.

Furthermore, the overall sample composition in the studies we reviewed was imbalanced, with female respondents outnumbering males at a ratio of 5:1. This higher rate of female participation may reflect that women are highly motivated and are more interested in taking care of their health, body weight and body image compared to men [27,28]. Previous findings have also shown that women report higher motivation and positive attitudes towards healthy eating and weight control compared to men [29]. According to Grogan [30], women were more determined to change their body weight and shape to achieve personal satisfaction, thus avoiding pressure in society. Studies like these may help to explain why women were more likely to volunteer for weight loss programs.

The reported outcomes also showed that the combination of hypnotherapy and dietary advice was significantly beneficial for reducing weight, improving nutrient intake and increasing quality of life and physical activity [19,23]. Furthermore, other studies have also reported changes in dietary habits after interventions involving hypnosis. For instance, Gelo et al. [20], showed an improvement of eating behavior in terms of restrained eating, disruption of poor eating habits and reduction in sensation of hunger as well as an enhanced body concept, such as self-acceptance of body and physical appearance after the intervention [20]. These positive responses are valuable for further exploring the benefits of hypnotherapy to help treat obesity. As dietary habits may be influenced by environmental factors [31,32], any undesirable dietary habits should be addressed during hypnosis session, as well as tips for healthy eating.

In addition, hypnotherapy was also found to support adherence to diet and exercise regimen in the long term, as participants in the hypnosis group continued to lose weight and met their weight goals, compared to control group, even at 8 months and 2 years of follow-ups [25]. A few studies have also reported significant weight reduction in intervention groups after several follow-ups (6, 12 and 18 months) [19–22]. Thus, this result shows that adding

Table 1
Appraisal on hypnotherapy interventions for weight loss.

Author & year	Sample size	Intervention		Length of intervention	Follow-up	Main findings	Comments
		IG	CG				
Bolocofsky et al., 1985 [25]	156 volunteers	Hypnosis + dietary counselling	Dietary counselling	9 weeks (one session/week)	2 years	BW loss: 4.0 kg (IG): 3.0 kg (BG); IG continued to 2-year follow-up	Participants not clinically obese; high drop-out rates (30%)
Cochrane and Friesen, 1986 [24]	60 overweight and obese women	Arm 1: Hypnosis + audiotapes; Arm 2: Hypnosis	Arm 3: Control	4 weeks (two 3-hour sessions per week)	6 months	Arm 1 and Arm 2 *vs* Arm 3: decreased BW ($P < 0.01$)	Use of audiotapes was not significant contributors to weight loss
Barabasz & Spiegel, 1989 [22]	61 females	Arm 2: Self-management + hypnosis; Arm 3: Hypnosis + specific food	Arm 1: Self-management	12 weeks (one meeting session)	3 months	Significant reduction in BW in Arm 3 compared to Arm 1 and Arm 2 (6.4 kg, $P < 0.05$)	Over-reporting since subjects were volunteers and those willing to lose weight
Stradling et al., 1998 [21]	60 obese patients with obstructive sleep apnoe	Arm 2: Dietary advice + hypnotherapy with stress reduction; Arm 3: Dietary advice + hypnotherapy with specific food suggestions	Arm 1: Dietary advice	8 weeks (two 30-minute sessions every 4 weeks)	18 months	BW reduction (2%–3% of initial BW) at 12 weeks; significant BW reduction for Arm 3 (3.8 kg; $P < 0.02$) after 18 months compared to Arm 1 and Arm 2	Weight loss without clinical significance; improper control for hypnotherapy techniques
Nurlita et al., 2007 [23]	22 obese	Hypnotherapy + nutrition counselling	Nutrition counselling	5 weeks (one session per week)		Reduction in BW (3.29 kg; $P < 0.05$); improvement on physical activity level ($P < 0.05$)	Small sample size; no long-term follow-up
Gelo et al., 2014 [20]	60 obese women	Arm 1: HypBe; Arm 2: HypEn		2.5 months (12 two-hour sessions per week)	6 months	HypEn (weight reduction): post-treatment ($P < 0.001$); follow-up ($P < 0.001$)	Therapist allegiance effects; no control group (without hypnosis treatment)
Bo et al., 2018 [19]	120 severe obesity	Hypnosis + lifestyle modifications	Lifestyle modifications	3.5 months (three 30-minute session at 0.5, 1.5 and 3.5 months)	12 months	Significant reduction in BW (~9.6 kg, $P < 0.001$), caloric intake (~682.5 kcal, $P = 0.005$) and QoL ($P = 0.01$)	High dropout rates (28%); client left without any reinforcement session (8 months) for too long

IG: intervention group; CG: control group; BW: body weight; QoL: quality of life; HypBe: hypnobehavioral therapy; HypEn: hypnoenergetic therapy.

hypnotherapy helps to promote lifestyle changes in an intervention and improves the ability of individuals to maintain their modest weight loss [33]. However, the long-term benefits of hypnotherapy for weight maintenance still needs further study.

Generally, respondents who used self-hypnosis more frequently (≥once a day) showed greater weight loss and improved dietary habits, compared to those who practiced it rarely or not at all [19,22]. Self-hypnosis is also easy to teach to participants and because of its simplicity, can be used at one's convenience. The results provide empirical support for self-hypnosis in promoting weight loss. Further, self-hypnosis has also produced positive results in decreasing pain and improving headaches for up to 12 months after treatment [34,35]. Self-monitoring activities, such as self-hypnosis, food diary and physical activity, may help individuals become aware of their current behaviors [36], develop self-regulatory skills to achieve personal goals, promoting behavioral changes that support weight loss [37].

Despite promising findings, there are several caveats to the evidence presented in this review that deserve attention. First, only seven articles were included in the review, despite our thorough search strategy, and selection bias may be present in this body of research, as it only included English language, peer-reviewed studies published in journals. Second, despite all studies concluding that hypnotherapy was efficacious for aiding weight loss, the techniques and duration administered to the respondents varied widely, and this could have directly or indirectly influenced the outcomes. Further, one study showed that there was no significant difference between the hypnosis and control groups. Third, due to the majority of respondents across the studies being women, this review may be biased by female responsiveness to hypnotherapy and their motivation to reach an idealized weight.

5. Conclusion

We conclude that hypnotherapy has been shown to be a safe and effective adjuvant treatment for assisting weight loss. However, methodological weaknesses such as small sample sizes, high drop-out rates, therapist allegiance effects, varied techniques and duration of the hypnotherapy interventions have prevented a more concrete conclusion. Thus, we suggest that further well-designed trials of a similar nature, but including gender balanced populations, are needed to conclusively demonstrate the effectiveness of hypnotherapy for weight loss in the general population.

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Authors' contributions

All authors attended multiple collaborative meetings to determine the review protocol (inclusion/exclusion) and discuss the structure of the results and discussion. NAR conducted the review process, reviewed all articles and wrote all sections of the manuscript. PLL critically revised, provided feedback and suggestion on multiple drafts of the manuscript and have corrected the manuscript for important intellectual context. All authors have checked and approved the final version of the manuscript. PLL was the corresponding author.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

[1] World Health Organization. Obesity and overweight. (2020-04-01) [2019-11-06]. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight.
[2] Chu DT, Minh Nguyet NT, Nga VT, Thai Lien NV, Vo DD, Lien N, et al. An update on obesity: mental consequences and psychological interventions. Diabetes Metab Syndr 2019;13(1):155–60.
[3] World Health Organization. Global action plan for the prevention and control of NCDs 2013-2020. (2013-03) [2019-10-23]. http://www.who.int/nmh/publications/ncd-action-plan/en/.
[4] Purton T, Mond J, Cicero D, Wagner A, Stefano E, Rand D, et al. Body dissatisfaction, internalized weight bias and quality of life in young men and women. Qual Life Res 2019;28(7):1825–33.
[5] Busutil R, Espallardo O, Torres A, Martínez-galdeano L, Zozaya N, Hidalgo-Vega A. The impact of obesity on health-related quality of life in Spain. Health Qual Life Outcomes 2017;15(1):197.
[6] Yeh TL, Chen HH, Chiu HH, Chiu YH, Hwang LC, Wu SL. Morbidity associated with overweight and obesity in health personnel: a 10-year retrospective of hospital-based cohort study in Taiwan. Diabetes Metab Syndr Obes 2019;12:267–74.
[7] Palo SK, Swain S, Priyadarshini S, Behera B, Pati S. Epidemiology of obesity and its related morbidities among rural population attending a primary health centre of Odisha. India. J Family Med Prim Care 2019;8:203–8.
[8] Peng FL, Hamzah HZ, Nor NM, Said R. Burden of disease attributable to overweight and obesity in Malaysia. Malays J Public Health Med 2018;18(1):11–8.
[9] Stelmach-Mardas M, Mardas M, Walkowiak J, Boeing H. Long-term weight status in regainers after weight loss by lifestyle intervention: status and challenges. Proceedings of the Nutrition Society 2014;73(4):509–18.
[10] Ramos SX. The ineffectiveness and unintended consequences of the public health war on obesity. Can J Public Health 2015;106(2):e79–81.
[11] Elkins GR, Johnson AK, Johnson AJ, Sliwinski J. Factor analysis of the Elkins hypnotizability scale. Int J Clin Exp Hypn 2015;63(3):335–45.
[12] Amariles P, Gonzalez LI, Giraldo NA. Prevalence of self-treatment with complementary products and therapies for weight loss: a randomized, cross-sectional study in overweight and obese patients in Colombia. Curr Ther Res Clin E 2006;67(1):66–78.
[13] Vickers A, Zollman C, Payne DK. Hypnosis and relaxation therapies. West J Med 2001;175(4):269–72.
[14] Hasan FM, Zagarins SE, Pischke KM, Saiyed S, Bettencourt AM, Beal L, et al. Hypnotherapy is more effective than nicotine replacement therapy for smoking cessation: results of a randomized controlled trial. Complement Ther Med 2014;22(1):1–8.
[15] Mendoza ME, Capafons A, Jensen MP. Hypnosis attitudes: treatment effects and associations with symptoms in individuals with cancer. Am J Clin Hypn 2017;60(1):50–67.
[16] Otani A. Hypnosis and mindfulness: the twain finally meet. Am J Clin Hypn 2016;58(4):383–98.
[17] Villa V, Manzoni GM, Pagnini F, Castelnuovo G, Cesa GL, Molinari E. Do coping strategies discriminate eating disordered individuals better than eating disorder features? An explorative study on female inpatients with anorexia and bulimia nervosa. J Clin Psychol Med Settings 2009;16(4):297–303.
[18] Moher D, Liberati A, Tetzlaff J, Altman DG. The PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med 2009;6(7):e1000097.
[19] Bo S, Rahimi F, Goitre I, Properzi B, Ponzo V, Regaldo G, et al. Effects of self-conditioning techniques (self-hypnosis) in promoting weight loss in patients with severe obesity: a randomized controlled trial. Obesity (Sliver Spring) 2018;26(9):1422–9.
[20] Gelo OCG, Zips A, Ponocny-Seliger E, Neumann K, Balugani R, Gold C. Hypnobehavioral and hypnoenergetic therapy in the treatment of obese women: a pragmatic randomized clinical trial. Int J Clin Exp Hypn 2014;62(3):260–91.
[21] Stradling J, Roberts D, Wilson A, Lovelock F. Controlled trial of hypnotherapy for weight loss in patients with obstructive sleep apnoea. Int J Obes Relat Metab Disord 1998;22(3):278–81.
[22] Barabasz M, Spiegel D. Hypnotizability and weight loss in obese subjects. Int J Eat Disord 1989;8(3):335–41.
[23] Nurlita H, Purba M, Paramastri I. Hipnoterapi untuk penurunan berat badan pada individu obes. J Gizi Klinik Ind 2007;4(1):30–4 [Malay with abstract in English].
[24] Cochrane G, Friesen J. Hypnotherapy in weight loss treatment. J Consult Clin Psychol 1986;54(4):489–92.
[25] Bolocofsky DN, Spinler D, Coulthard-Morris L. Effectiveness of hypnosis as an adjunct to behavioral weight management. J Clin Psychol 1985;41(1):35–41.
[26] Grave RD, Suppini A, Calugi S, Marchesini G. Factors associated with attrition in weight loss programs. Int J Behav Consult Ther 2006;2(3):341–53.
[27] Dondzilo L, Rieger E, Jayawardena N, Bell J. Drive for thinness versus fear of fat: approach and avoidance motivation regarding thin and non-thin images in women. Cogn Ther Res 2019;43(3):585–93.
[28] Dohm FA, Beatiie JA, Aibel C, Ruth HS. Factors differentiating women and men who successfully maintain weight loss from women and men who do not. J Clin Psychol 2001:105–17.
[29] Young DR, Gittelsohn J, Charleston J, Felix-Aaron K, Appel LJ. Motivations for exercise and weight loss among African-American women: focus group results and their contribution towards program development. Ethn Health 2001;6(3–4):227–45.
[30] Grogan S. Body image: understanding body dissatisfaction in men, women and children. 2nd ed. New York: Routledge Taylor & Francis Group; 2008.
[31] Brug J. Determinants of healthy eating: motivation, abilities and environmental opportunities. Fam Pract 2008;25(Suppl 1):i50–5.
[32] González-Ramírez E, Carrillo-Montoya T, García-Vega ML, Hart CE, Zavala-Norzagaray AA, Ley-Quiñónez CP. Effectiveness of hypnosis therapy and Gestalt therapy as depression treatments. Clínica y Salud 2017;28(1):33–7.
[33] Prag A. Cognitive-behavioural hypnotherapy and obesity: a single case study. South Africa: University of Stellenbosch; 2007.
[34] Jensen MP, Ehde DM, Gertz JK, Stoelb BL, Dillworth TM, Hirsh AT, et al. Effects of self-hypnosis training and cognitive restructuring on daily pain intensity and catastrophizing in individuals with multiple sclerosis and chronic pain. Int J Clin Exp Hypn 2011;59(1):45–63.
[35] Anbar RD, Zoughbi GG. Relationship of headache-associated stressors and hypnosis therapy outcome in children: a retrospective chart review. Am J Clin Hypn 2008;50(4):335–41.
[36] Burke LE, Wang J, Sevick MA. Self-monitoring in weight loss: a systematic review of the literature. J Am Diet Assoc 2011;111(1):92–102.
[37] Carels RA, Darby LA, Rydin S, Douglass OM, Cacciapaglia HM, O'Brien WH. The relationship between self-monitoring, outcome expectancies, difficulties with eating and exercise, and physical activity and weight loss treatment outcomes. Ann Behav Med 2005;30(3):182–90.