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Plant extracts with appetite suppressing properties for body weight control: A systematic review of double blind randomized controlled clinical trials

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KEYWORDS
Plant extracts;
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Summary
Overview: As obesity has reached epidemic proportions, the management of this global disease is of clinical importance. The availability and popularity of natural dietary supplements for the treatment of obesity has risen dramatically in recent years.
Aims: The aim of this paper was to assess the current evidence of commonly available natural supplements used to suppress appetite for obesity control and management in humans using a systematic search of clinical trials meeting an acceptable standard of evidence.
Methods: The electronic databases PubMed, Web of Science, Google Scholar, ScienceDirect, and MEDLINE with full text (via EBSCOHost) were accessed during late 2012 for randomized controlled clinical trials (RCTs) using natural plant extracts as interventions to treat obesity through appetite regulation. A quality analysis using a purpose-designed scale and an estimation of effect size, where data were available, was also calculated. The inclusion criteria included the following: sample participants classified as overweight or obese adults (aged 18—65 years), randomized, double blind, controlled design, suitable placebo/control intervention, sample size >20, duration of intervention >2 weeks, have measurable outcomes on appetite or food intake and anthropometry, and full paper in English.
Results: There were 14 studies that met the inclusion criteria. The findings from published double blind RCTs revealed mostly inconclusive evidence that plant extracts are effective in reducing body weight through appetite suppression. *Caralluma fimbriata* extract and a combination supplement containing *Garcinia cambogia* plus *Gymnema sylvestre* were the only exceptions.
Conclusion: According to the findings from this systematic review, the evidence is not convincing in demonstrating that most dietary supplements used as appetite suppressants for weight loss in the treatment of obesity are effective and safe. A balance between conclusive findings by double blind RCTs and advertisement is required to avoid safety concerns and dissatisfaction from consumers.

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Background

The prevalence of obesity is reaching epidemic proportions worldwide, which is associated with several co-morbidities such as type 2 diabetes, dyslipidemia, degenerative arthritis, obstructive sleep apnea, hypertension and cardiovascular disease.[1] Fortunately, there is strong evidence that modest body weight loss of 5—10% significantly reduces the risk of these co-morbidities.[2] There are a variety of effective options for weight loss in the treatment of overweight and obesity which include dietary therapies, altering physical activity, behavioural techniques, pharmacotherapy, surgery and a combination of these strategies.[2] The first-line of therapy for the management of obesity has the least risk which consists of lifestyle changes including diet, exercise and behavioural modification. The second-line of therapy for obesity treatment is pharmacotherapy, which is often recommended when lifestyle modification is ineffective in producing sufficient weight loss. The last approach in extreme cases of morbid obesity is through surgical therapy. Surgical treatment is an option for a limited number of patients with clinically severe or morbid obesity (BMI > 40 or >35 with comorbid conditions) and is reserved for those who are suffering from the complications associated with extreme obesity or are unresponsive to nonsurgical treatment.[3] Due to the difficulty in maintaining sustained lifestyle changes, potential complications of surgery and accompaniment of serious adverse effects associated with pharmacotherapy, it is not surprising that the general public frequently turn to easily obtainable over the counter proprietary weight loss products such as herbal products, nutritional supplements and meal replacements. Pharmacognosy research including medical ethnobotany, ethnopharmacology, and phytotherapy studies as well as rigorous RCTs are yet to be carried out on many of these products and in reality, marketing takes priority over the safety and efficacy of many weight loss products. The findings of a multi-state survey conducted in the US revealed that 7% of adults used non-prescription/over the counter weight loss supplements, with a greater proportion of use among young obese women.[4] In addition, retail sales of weight loss supplements were estimated to be greater than $1.3 billion in 2001.[5]

Plant extracts have been used for many centuries in the Eastern world, however the use of these extracts have recently become increasingly prevalent around the world. Several chemical constituents isolated from plants and crude extracts have been found to prevent diet induced obesity and significantly reduce body weight in the treatment of obesity. Due to the prevalent use of plant extracts, evidence is required to support claims of efficacy. Previous publications have explored anti-obesity agents for weight loss, however to date no systematic review has been conducted on plant extracts that elicit appetite suppression properties, assessing the quality of studies as well as assessing the methodology, dosage, duration of intervention and the strength of their clinical effects. This paper provides details in biochemical characterization of bioactive compounds from plant extracts, methods used for assessing appetite, and provides a toxicological evaluation and clinical evaluation including efficacy of plants extracts in RCTs. Thus the purpose of this paper is to present a systematic review of plant extracts possessing appetite suppressing properties for obesity treatment.

Methods

The electronic databases PubMed, ScienceDirect, Web of Science, Google Scholar, and MEDLINE with full text (via EBSCOHost) were accessed up to December 2012 (see Fig. 1 for systematic flowchart). The databases were searched using anti-obesity search terms in combination with specific interventions using plant extracts (see Appendix 1 for intervention search term list). Papers that met the inclusion criteria were human RCTs of acceptable methodological rigour.

The inclusion criteria included:

1. Sample participants classified as overweight or obese adults (aged 18—65 years)
2. Randomized, double blind, controlled design
3. Suitable placebo/control intervention
4. Sample size >20
5. Duration of intervention >2 weeks
6. Have measurable outcomes on appetite or food intake and anthropometry
7. Full paper in English

Studies that involved a combination treatment were considered acceptable. All other papers that did not meet these criteria as well as systematic reviews and meta-analyses were excluded. All studies were selected according to defined criteria and data were validated and extracted in