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Weight loss is coupled with improvements to affective state in obese participants engaged in behavior change therapy based on incremental, self-selected "Small Changes"

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Abstract

The aim of this study was to investigate the effects of a group behavior change intervention involving self-selected, contextualized, and mediated goal setting on anthropometric, affective, and dietary markers of health. It was hypothesized that the intervention would elicit changes consistent with accepted health recommendations for obese individuals. A rolling program of 12-week "Small Changes" interventions during 24 months recruited 71 participants; each program accommodated 10 to 13 adults (body mass index [BMI] ≥30 kg/m^2). Fifty-eight participants completed Small Changes. Repeated measures were made at baseline, 6 and 12 weeks. Anthropometric measures included height and weight (to calculate BMI), body composition, waist circumference, and blood pressure. Affective state was monitored using relevant validated questionnaires. Dietary assessment used 3-day household measures food diaries with Schofield equations to monitor underreporting. Relevant blood measures were recorded throughout. Across the measurement period, Small Changes elicited a significant reduction in body weight (baseline, 102.95 ± 15.47 vs 12 weeks 100.09 ± 16.01 kg, $P < .0005$), coupled with associated significant improvements in BMI, body fat percentage, and waist circumference measures. There were additional significant positive changes in measures of affective state including general well-being (baseline, 58.92 ± 21.22 vs 12 weeks 78.04 ± 14.60, $P < .0005$) and total mood disturbance (baseline, 31.19 ± 34.03 vs 12 weeks 2.67 ± 24.96, $P < .0005$). Dietary changes that occurred were largely consistent with evidenced-based recommendations for weight management and included significant reductions in total energy intake and in fat and saturated fat as a proportion of energy. The Small Changes approach can elicit a range of health-orientated benefits for obese participants, and although further work is needed to ascertain the longevity of such effects, the outcomes from Small Changes are likely to help inform health professionals when framing the future of weight management. Long-term follow-up of Small Changes is warranted.

Keywords: Behavior therapy; Obesity; Body weight; Waist circumference; Affect; Adults

Abbreviations: BMI, body mass index; BMR, basal metabolic rate; EI, energy intake; GWB, general well-being; HDL, high-density lipoprotein; ICD, intensive conventional diet; NMES, non–milk extrinsic sugars; POMS, Profile of Mood States; TFEQ-R18, Three-Factor Eating Questionnaire-R18; VLCD, very low calorie diet.

1. Introduction

Around two thirds of the population in England is obese or overweight, and more than 300 million adults are obese

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worldwide [1]. Obesity has several deleterious effects on health. It is a known risk factor for coronary heart disease partly because of its association with hypertension, type 2 diabetes, and hypercholesterolemia; and there is increasing evidence that it is a risk factor for stroke, osteoarthritis, and some cancers [1]. The negative psychosocial effects of obesity are well-documented and include body dissatisfaction, depression, and low self esteem [2]. The recent rapid rise in obese and overweight can be attributed to overarching changes in behavior and inability to respond to a rapidly changing environment [3].

Long-term weight reduction in obesity can be of considerable benefit for reducing the risk of nutrition-related chronic disease [4]. Dieting interventions are rarely successful; some even suggest that this type of restrained eating induces counterregulatory responses that could be deemed iatrogenic [5]. Dieting is a common behavioral phenomenon; yet the number of "dieters" and the rate of obesity appear to have increased in parallel [6]. Many dieters succeed in losing weight; although only between 5% and 10% achieve long-term weight loss [7-13]. This may be because many popular diets are not evidence based and do not consider the effects on micronutrient status, metabolic parameters, appetite, psychological well-being, and long-term hormonal regulators of energy intake (EI) and expenditure. Following a scientifically unsound diet may therefore result in quantitative and qualitative nutritional imbalance [7].

Weight-loss pharmacotherapy requires long-term application to be effective, can be financially costly, and may be accompanied by unpleasant side effects [8]. Prospective, randomized, controlled trials have established the efficacy of antiobesity drugs but not for longer than 2 years [9] and it is generally accepted that pharmacotherapy interventions must be combined with lifestyle modification to maximize their efficacy [10]. Bariatric surgery can be associated with major nutritional and medical complications [11] yet is arguably the most effective and durable way to reduce weight in the morbidly obese [12].

Behavior change techniques (eg, awareness-raising activities and self-selected goal setting) have been shown to be effective in tackling overweight and obesity when they are coupled with positive dietary and physical activity modifications, more so than any of these strategies used in isolation [13]. A recent systematic review concluded that approaches combining diet, behavior modification, and exercise training elicited the most successful outcome when treating the overweight (body mass index [BMI] $\geq$25.0 kg/m^2) or obese (BMI $\geq$30.0 kg/m^2) [14]. In practice, behavior change philosophies differ dramatically from one to the next, making comparison difficult. One consistent feature, however, is a multidisciplinary ethos [14].

The effect of a behavior change intervention on collective wide-ranging anthropometric, affective, and dietary markers in the obese has not been widely reported; and the effects of our "Small Changes" approach are previously unpublished. We hypothesize that behavior change therapy based on incremental, self-selected Small Changes will elicit beneficial changes for obese participants across all of these markers of health and well-being.

Small Changes is a psychosocial behavior change intervention program for weight management. It draws on a neurolinguistic programming approach initiated by Bandler and Grinder [15] in 1975 and uses solution-based therapy [16] and motivational interviewing [17] techniques in facilitating participants' self-selection of small lifestyle changes. These changes may be weight-management orientated and consistent with those championed by Hill [18]; however, they may focus more broadly on issues around self-control, family life, stresses, or personal organization. These changes are contextualized within the lives of the participants (ie, it is the barriers faced by the individual that are tackled). Small Changes uses a 12-week protocol. The multidisciplinary outcomes reported here have been pooled from 12-week Small Changes programs run for a 24-month period from September 2007 to September 2009 in Sheffield, UK.

2. Methods and materials

We conducted an intervention study to investigate the effects of the 12-week Small Changes intervention using a repeated-measures design on a range of physical, affective, dietary, and blood measures.

2.1. Recruitment, attrition, and completion rates

Small Changes participants were recruited via advertisements positioned around the university, in local newspapers, on local radio stations, and in various department stores throughout Sheffield city center; via local blogs, and word-of-mouth. Each Small Changes cohort recruited 10 to 13 obese (BMI $\geq$30 kg/m^2) adults. Suitable participants were invited to an informal gathering. Each cohort's prescreening event was scheduled so to be held on the same weekday, at the same time and in the same location as the Small Changes weekly sessions would subsequently be delivered.

At the prescreening event, a brief history of weight change and dieting attempts was recorded for each participant. Motivation to change and confidence in tackling the problem were assessed by trained facilitators. This qualitative information was not used to include or exclude participants dependent on their responses but was informative for the facilitators. Participants tended to be highly motivated to change, hence their attendance at the outset. Exclusion criteria included a BMI less than 30 kg/m^2, known unmanaged serious health issues (except obesity), diagnosed type 1 diabetes (because of fasting prescribed in our method), or being fitted for a pace maker/other implantable electronic device (contraindicated in bioelectrical impedance analysis). These data were collected using a basic medical screening questionnaire. This research was approved via the appropriate university ethics procedures (reference: