

PAPER

Weight maintenance and relapse in obesity: a qualitative study

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OBJECTIVE: To investigate, among women with obesity who have lost weight, the psychological factors associated with successfully maintaining the new lower weight, as opposed to weight regain.

DESIGN: Qualitative research methods (in-depth individual interviews and group interviews) were used to assess the characteristics of successful weight maintainers, as compared with weight regainers and healthy-weight women.

SUBJECTS: In all, 76 females were recruited from the community, comprising 28 formerly obese women who had lost weight and maintained their new lower weight for at least 1 y; 28 obese women who had lost weight but regained the weight that they had lost; and 20 women with a stable weight in the healthy range.

RESULTS: Certain psychological factors were identified which characterised the regainers but not the maintainers. These factors were: failure to achieve weight goals and dissatisfaction with the weight achieved; the tendency to evaluate self-worth in terms of weight and shape; a lack of vigilance with regard to weight control; a dichotomous (black-and-white) thinking style; and the tendency to use eating to regulate mood.

Conclusion: The results suggest that psychological factors may provide some explanation as to why many people with obesity regain weight following successful weight loss. The factors identified in this study need to be examined further using prospective designs.

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Introduction

It is a consistent finding that the weight lost by obese patients as a result of the most widely available treatments for obesity (pharmacological treatment and behavioural treatment) is almost always regained over time.^{1–4} Usually about half the weight lost is regained in the first year following treatment⁴ with weight regain continuing thereafter, so that by 3–5 y post-treatment about 80% of patients have returned to, or even exceeded, their pretreatment weight.^{4–6} Little research has been carried out on the processes associated with weight regain, as opposed to successful weight maintenance, in obesity. Studies that have followed-up obese patients who have participated in treatment trials have suggested that relapse is attributable to individuals' failure to persist with the weight-control behaviours that they adopted to achieve weight loss, such

as the consumption of a low-fat diet⁷; regular physical activity^{7–10}; and the regular monitoring of body weight.^{1,2,7,8,11–13} Little attention has been paid to why this is the case and how some formerly obese individuals are able to persist with these forms of behaviour.¹⁴

The findings of a small number of retrospective studies suggest that factors such as having unrealistic weight goals,^{15–17} poor coping or problem-solving skills,^{11,12,18,19} low self-efficacy,^{7,11,15,20} and an imbalance between the effort involved and the benefits received from weight maintenance^{21,22} may contribute. However, these studies have been limited in both scope and design, and their findings have been inconsistent. The present study used formal qualitative research methods to investigate the psychological factors associated with weight maintenance and relapse in obesity.

A qualitative approach was considered to be the most appropriate for a study of this type. As previously mentioned, relatively little research has investigated the factors that might be associated with weight maintenance and

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relapse in obesity, and the available data relating to the influence of psychological factors, in particular, are scarce and inadequate. Qualitative research methods are ideally used to explore a particular issue in detail, and are especially suitable when the variables associated with an outcome are unclear or poorly understood.²³ Thus, the present study used formal qualitative research methods to obtain the type of detailed information needed to generate hypotheses about the psychological factors associated with successful (and unsuccessful) weight maintenance. These hypotheses could then be tested in a subsequent quantitative study using experimental survey techniques.

Methods

Participants

The participants were 76 females, aged between 20 and 60 y, recruited using local newspaper advertisements. Three groups were recruited:

1. *'Maintainers'* ($n = 28$). Women with a history of obesity ($BMI > 29.9 \text{ kg/m}^2$) who, at some point within the last 2 y, had lost at least 10% of their initial body weight as a result of deliberate caloric restriction, and who had maintained their new lower weight (to within a range of 3.2 kg [half a stone]) for at least 1 y. This range was decided upon both to discriminate between mere weight fluctuation and weight regain, and to ensure a clear demarcation between Maintainers and Regainers.

2. *'Regainers'* ($n = 28$). Women meeting the same criteria as the Maintainers except that they had regained weight to within 3.2 kg of their original body weight.

3. *Stable healthy weight* ($n = 20$). Women of healthy weight ($BMI 20\text{--}25 \text{ kg/m}^2$), with no history of obesity, who had maintained their weight (within a range of 3.2 kg) for at least 2 y.

Potential participants were excluded if (i) their weight loss was because of a specific medical or psychiatric condition or the use of medication (eg, thyroid hormones); (ii) their weight loss or regain was a result of pregnancy or child birth or (iii) they reported a history of anorexia nervosa or bulimia nervosa. An attempt was made to select participants from as broad a range of demographic variables and experiences as possible within the three groups. Thus, of the 89 volunteers who fulfilled the entry criteria, 28 Maintainers, 28 Regainers and 20 Stable healthy weight women were selected to take part.

Design

The study had two phases. Phase 1 involved in-depth individual interviews with 20 women from each group (60 in total), and Phase 2 involved two group interviews, each with eight women—four Maintainers and four Regainers—(16 in total) who had been recruited at the outset, but who had not already taken part in the study.

Phase 1: individual interviews

Interview schedule. An individual interview schedule comprising four sections (or modules) was designed for this study. Module 1 included structured questions to obtain general demographic information, weight details and a brief weight history. Module 2 was an open-ended exploratory interview. For Maintainers and Regainers this focused on their most recent weight loss attempt, the outcome of that attempt, their subsequent weight trajectory and the factors that were perceived to have influenced weight maintenance or regain. Participants were asked to tell the story of their most recent weight loss attempt and to describe what had happened to their weight since that time. For healthy weight women, this section focused on any strategies they used to maintain a stable healthy weight. All participants were encouraged to talk about their ideas, beliefs and attitudes regarding weight loss, weight maintenance and weight regain. Topics were discussed in the order that they arose naturally during the interview, but the interviewer was able to prompt participants using questions derived from a checklist of prompting questions, so that those domains of interest not covered spontaneously were, nevertheless, discussed. In Module 3, the interviewer gave a summary of the information that had been provided by the participant so far. The participant was asked to comment on the accuracy of the summary and add further information as needed. Any discrepancies were clarified. Module 4 was comprised of a series of semistructured questions based on hypotheses that had been generated from previous interviews. The aim was to determine which hypotheses were compatible with, and which differed from, the participant's personal experience.

The interview schedule was initially tested in a pilot study involving five women from each group. The interview itself was iterative, and evolved (only by gaining items) over the course of the study.

Of the 60 women, 44 involved in Phase 1 were interviewed in their own homes, with the remainder of the interviews being conducted at Oxford University, Department of Psychiatry. All of the interviews were conducted by the first author, and each lasted between 60 and 180 min.

Data analysis. The main objective of the analysis was to identify factors that clearly differentiated Maintainers and Regainers. Transcripts were analysed with NUD*IST software.²⁴ The entire text of each interview was entered onto a computer data base and lines of text were coded (ie, assigned a number) into one of 64 possible categories based on their content. For example, a line of text referring to a participant's body image was assigned a code, which corresponded to a category labelled 'body image'; and a line of text referring to a participant's desired weight was coded such that it corresponded to a category labelled 'weight goals'. Thus, in each category lines of text that represented similar themes or topics were grouped together. The data were analysed in 'blocks' of five interviews with each group of participants. After the first block of interviews had been

conducted, transcribed and coded, emergent themes, patterns and hypotheses about various psychological factors were identified, and reviewed by the authors. As part of this process, cases that seemed to contradict or challenge the hypotheses derived from the majority were always considered, and special attention was paid to those data that conflicted with the dominant interpretations or suggested rival explanations. For example, two Regainers believed that, for physiological reasons, they found it harder to lose weight and easier to gain weight than most other women. No other Regainers shared this belief. However, the hypothesis that this belief may influence susceptibility to weight regain was still considered. Module 4 of the interview schedule was then modified by adding questions about the new factors. In this way the emerging hypotheses could be tested using the next block of participants in each group. This process was repeated for the next block of five participants per group, and then repeated once more for the final block of participants. After all the interviews had been completed, the total data set was considered as a whole.

During the course of the analysis, random samples of five interview transcripts from each group (15 in total) were coded by two independent investigators to assess agreement between coders on assigning lines of text to categories. The mean intercoder reliability coefficient across all interview categories was $r = 0.75$, $P < 0.01$.

Phase 2: validation

Group interviews. The primary aim of Phase 2 was to check whether the factors identified in Phase 1 of the study were supported by a new group of participants using a different study method. Two group interviews, each lasting for 90 min, were conducted. Each group consisted of four Maintainers and four Regainers plus two researchers.

The interview focused on the presentation of a structured case vignette which served as a respondent validation tool. The use of a structured vignette for validating qualitative data was first described by Greenhalgh *et al.*²⁵ These researchers were consulted during the planning stages of the present study regarding the extension of their method for use with groups of participants (rather than with individuals). The vignette was presented to the group in the form of a story about Mrs Brown, a weight 'regainer'. The vignette was read twice to the group by the primary researcher. The first time it was read in full, and the second time it was re-read slowly, broken up into sections of one or two sentences. After each section the researcher asked: 'Do you agree that Mrs Brown would have acted in this way?/ thought like this?' Discussion between group members was encouraged and areas of dissent were explored. During this process, the second researcher used a checklist to quantify the number of participants who agreed with, disagreed with, or were undecided about the particular section of the vignette that was being discussed.

Data analysis. After the transcripts from both group interviews had been coded, statements made by participants, together with quantitative data collected during each group, were examined to determine whether or not the hypotheses generated in Phase 1 were supported. Factors that generated less than 50% agreement were discounted. Using this method, 10 of the 15 factors presented to participants in phase 2 were supported. The factors that were discounted included those that suggested that, compared to Maintainers, Regainers were more likely to: fail to respond to satiety cues, show insufficient concern about weight and shape, attempt weight loss in isolation rather than as part of a broader change in lifestyle, experience a sense of deprivation (with regard to food), and overeat in order to avoid forming intimate relationships.

Results

Subject characteristics

Table 1 describes the characteristics of the participants in each of the three groups.

Factors

The factors that clearly discriminated between Maintainers and Regainers fell into three broad categories—behavioural factors, cognitive factors and affective factors. Table 2 presents the percentage of participants in each group that endorsed each of the factors listed below.

Behavioural factors. As expected, there were clear differences between Maintainers and Regainers with regard to behavioural factors of relevance to weight control, such as dietary intake, activity level and weight monitoring following successful weight loss (see Table 3). Maintainers reported continued adherence to a relatively low-fat diet, regular exercise and frequent weight and/or shape monitoring. In contrast, most Regainers failed to sustain any of these behaviours. Maintainers also, unlike Regainers, reported responding quickly to counteract any detected weight gain by reducing their food intake and making an effort to increase their activity level. In general, Healthy Weight subjects appeared to be similar to Maintainers with regard to these behavioural factors.

Cognitive factors. Five main cognitive factors were identified which discriminated between Maintainers and Regainers.

(i) Goals:

A greater proportion of Maintainers than Regainers reported that they had achieved their weight goal while losing weight. Most Maintainers reported feeling satisfied with their new lower weight, even if they had not reached their weight goal

Table 1 Characteristics of the three groups of participants

	Maintainers (N = 28)	Regainers (N = 28)	Healthy weight (N = 20)	Total (N = 76)
<i>Age</i>				
Mean age in years (s.d.)	44.67 (11.53)	44.40 (9.28)	35.91 (8.64)	41.14 (11.56)
<i>Marital status and children</i>				
Single	21%	4%	45%	21%
Married	61%	79%	55%	66%
Separated or divorced	18%	11%	0%	11%
Widowed	0%	7%	0%	3%
Mean number of children (% with at least one child)	1.33 (61%)	1.67 (64%)	0.73 (45%)	1.29 (59%)
<i>Social class</i>				
Social class I-II	46%	39%	60%	47%
Social class III _{nm} -III _m	39%	36%	10%	30%
Social class IV-V	0%	0%	5%	1%
Students	11%	7%	25%	13%
Housewives	4%	14%	0%	7%
Unemployed	0%	4%	0%	1%
<i>Weight details</i>				
Mean weight (in kg) before most recent weight loss attempt (BMI, kg/m ²)	87.69 (32.66)	89.93 (34.85)	NA	
Mean weight (in kg) after most recent weight loss attempt (BMI, kg/m ²)	66.68 (24.82)	72.83 (28.23)	NA	
Percent weight loss achieved during most recent weight loss attempt (s.d.)	22.8% (10.77)	18.5% (11.88)	NA	
Mean current weight in kg (BMI, kg/m ²)	67.54 _a (25.15) _a	92.81 _b (35.93) _b	58.80 _a (21.51) _a	
Percentage of the weight lost regained (s.d.)	5.6% _a (9.79)	110.6% _b (28.80)	NA	

Note. Means with different subscripts differ significantly at $P < 0.05$

Table 2 Percentage of the individual interview participants in each group who endorsed the identified factors

Factor	Percentage of participants endorsing each factor		
	Maintainers N = 20	Regainers N = 20	Healthy weight N = 20
<i>Behavioural factors</i>			
Adhered to a low-fat diet	87%	0%	67%
Took regular physical activity	73%	7%	80%
Monitored weight frequently	73%	40%	80%
Responded quickly to detected weight gain	73%	0%	100%
<i>Cognitive factors</i>			
Weight goals and satisfaction with weight			
Had achieved weight goal	60%	40%	NA
Were satisfied with new lower weight	87%	40%	NA
Had achieved other goals besides weight loss	87%	30%	NA
Self-evaluation largely based on weight and shape	13%	73%	33%
Vigilance			
High degree of vigilance with regard to weight control	93%	7%	87%
Benefits of weight maintenance reported to outweigh the effort involved	93%	13%	NA
Dichotomous thinking style	7%	73%	0%
Responded to adverse life events by eating	20%	91%	11%
<i>Affective factors</i>			
Eating used to regulate mood or act as a distraction	20%	90%	0%

The amazing thing is, in the past if I'd been 9 and a half stone I'd be disgusted with myself, I'd be really heavy, and now I was jubilant because I felt I was really light. It's all relative. (Maintainer)

In contrast, the majority of Regainers remained dissatisfied with their weight following weight loss (in some cases, despite having achieved their goal weight).

Table 3 Examples of verbatim quotes relevant to behavioural factors

Behavioural factors	Verbatim quotes
Dietary intake	'I knew I couldn't go back to what I was doing before. So I keep an eye on fat and alcohol, no eating masses of fried food or huge amounts...because this is what I've got to do to stay at this weight.' (Maintainer) '...Then you go off the diet and you find yourself going straight back to what you were doing before.' (Regainer) '...This is my motto. Eat everything, just small amounts of it.' (Healthy Weight)
Physical activity	'Once I started losing weight, I began to get the confidence to know that I could do aerobics and swimming... and now I do some form of physical exercise every day.' (Maintainer) 'While I was losing weight I was swimming three times a week and I joined a badminton club. But I think I am basically a lazy person. I've stopped doing exercise. I use the car a lot...my lifestyle is too busy.' (Regainer) 'It's always been my routine. After doing what I do during the day, I go and exercise. It's so ingrained I wouldn't change that.' (Healthy Weight)
Weight monitoring	'Weighing myself is simply part of preparing myself for every day.' (Maintainer) 'I was too frightened to get on the scales. I knew that if I weighed myself and I had put on, then I'd just go off the rails, and eat and eat. So I'm better off not knowing.' (Regainer) 'I see myself in the mirror most days. I'm more concerned with what I look like rather than the numbers on a scale. I don't really know how much I weigh, but I know that I look fine.' (Healthy Weight)

When I got down to 10 stone, I felt really slim. But after a few weeks I started feeling fat again. I used to think it would be wonderful to get down to a size 14, but once I did, I wanted to get to a size 12, or even a 10. (Regainer)

All Healthy Weight participants considered themselves to be close to their ideal weight, although many expressed a degree of discontent with their body shape.

Half a stone lighter would be my ideal weight, but I realize that's what most people think, and to actually achieve that would be quite a lot of work for not that much. (Healthy Weight)

Participants also identified a range of other goals that they had hoped to achieve by losing weight, such as improved appearance, health or self-esteem. Almost all of the Maintainers, but only about one-third of the Regainers, felt that they had satisfactorily achieved these goals.

(ii) *Importance of shape and weight for self-evaluation:*

The majority of Regainers reported that their weight and shape unduly influenced their self-worth and they described a high degree of preoccupation with weight and shape.

...I was so emotionally involved with trying to lose weight and trying to be something I couldn't be, I let go of everything else. The weight thing takes over your life... I see parallels with anorexia. They live around their bodies, as we do, but on the other side of the scale. (Regainer)

Maintainers and Healthy Weight subjects appeared to place less importance on weight and shape.

I have still got a certain amount of caution about it all. But you've got to have a happy medium between encoura-

ging yourself and whacking yourself over the head. (Maintainer).

It's (weight and shape) not at all the most important thing to me. I would say I'm not worried about my weight and shape, but I'm conscious of it. (Healthy Weight)

(iii) *Vigilance:*

Almost all of the Maintainers, but only one Regainer, reported that following successful weight loss they remained vigilant about their weight, particularly with regard to dietary intake. These Maintainers believed that the benefits of successful weight maintenance outweighed the substantial effort involved.

This time I was conscious of it. I was watching what I was eating in a way that I hadn't been before. (Maintainer)

In contrast, most Regainers felt that the effort involved in weight maintenance was not worthwhile, particularly since they had not achieved their weight goals.

It's so distressing to realize that you've got to continue to watch what you eat for the rest of your life. It's like having to spend the rest of your life driving. You have to be conscious of it all the time. Plus I didn't think I had lost enough weight, and it's such hard work that I didn't think it was worth following through...I wasn't really getting any payoff. (Regainer)

Healthy weight subjects generally described a relatively high degree of vigilance, although they did not view weight control as difficult.

I make very conscious decisions about what I eat. (Healthy Weight)

(iv) *Dichotomous thinking:*

A dichotomous ('black-and-white' or 'all-or-nothing') thinking style was more commonly observed among the Regainers than the Maintainers or Healthy Weight subjects. Many Regainers spoke about eating, weight and shape in dichotomous terms and there was evidence that this way of thinking reflected their general style of thinking.

I have very strict ideas about what failure and success are made of. In my head, I always think I'd like to be 8 stone... Obviously if you don't get to 8 stone you're still fat. (Regainer)

Maintainers and Healthy Weight subjects tended to express less polarised views on eating, weight and shape, and their control.

I plan what I'm going to eat, but if I can't keep to it exactly, well not to worry because that's life... (Maintainer).

(v) *Coping with perceived negative life events:*

The majority of Maintainers and Regainers reported the occurrence of adverse life events since they had lost weight, but they differed in the way they coped with these events. When faced with a stressful situation, Regainers reported that they habitually overate.

It's not being able to control the situation... not being able to sort my problems out, so I need to eat to make me feel good. It's just immature, I think. It's like a little child who hasn't quite worked out how to handle things and be calm about it... (Regainer)

In contrast, Maintainers and Healthy Weight participants appeared to be able to sustain their established pattern of eating and exercise in the face of difficult circumstances.

I have had some pretty hard times since losing weight, real struggles with money and quite traumatic experiences, but nothing ever made me put on weight. So I don't think experiences like that affect me in that way. (Maintainer).

Affective factors

One affective factor emerged from the data (see Table 4). Regainers were far more likely than Maintainers and Healthy

Weight participants to report using eating to regulate their mood ('comfort eating'), or to distract themselves from unpleasant thoughts and moods ('avoidance eating').

Discussion

There is substantial evidence to suggest that a modest weight loss of 5–10% of initial body weight is associated with significant physical and psychosocial benefits for those with obesity so long as the weight lost is maintained.^{26–28} However, it is clear that while patients who are in treatment can generally maintain their new lower weight, once treatment ends they gradually regain weight. Little research has investigated the psychological mechanisms that might account for this phenomenon. The present study has identified a range of specific behavioural, cognitive and affective factors that discriminated successful weight maintainers and weight regainers.

Behaviourally, Regainers were less likely to report adherence to a low-fat diet, regular physical activity and weight monitoring. Moreover, Regainers tended to delay responding to weight gain. Similar findings have emerged from previous studies of successful weight maintenance.^{1,2,7,10,16,29}

With regard to cognitive and affective factors, Regainers were more likely than Maintainers not to have achieved their weight goals and to express dissatisfaction with their new lower weight; to place excessive importance on weight and shape for self-evaluation; to lack vigilance with regard to weight control; to show a dichotomous thinking style; to respond to adverse life events by eating, and to eat to regulate mood or avoid negative affect.

Some of these factors were also identified by earlier small-scale studies.^{11,12,15,17–20,29} However, others have not previously been linked to the problem of weight regain. These include, the perceived failure to achieve goals *other than* weight loss; the tendency to evaluate self-worth in terms of shape and weight; the tendency to use food and eating to regulate mood or to avoid negative affect; and a dichotomous thinking style.

These findings suggest that weight regain in obesity should not be viewed from an exclusively biological perspective. Psychological factors may, at least partly, account for many individuals' lack of persistence with weight maintenance behaviour following successful weight loss. For example, one potential explanation for weight

Table 4 Examples of verbatim quotes relevant to affective factors

Affective factors	Verbatim quotes
Function of eating	'I've learnt to look for other things that give me the same feeling that eating might. Because that, for me, seemed to be the only way forward.' (Maintainer) 'Food is like a sedative to me. It knocks me out, like a drug. When I feel any little bit of sadness or anger, I eat. It's almost like being fed as a baby. I will eat and eat until I can't move and then I go and lie down and I sleep. And it's almost like, 'Here baby, come to mother... (Regainer) 'Eating stops the process of my brain going. It offers relief from thoughts that might actually be quite uncomfortable.' (Regainer)

regain may be that individuals (especially those with a dichotomous thinking style) who do not achieve the weight (and other objectives) that they had hoped to achieve during weight loss, will consider any weight loss to be inadequate and unsatisfactory. Such individuals are unlikely to be motivated to maintain a weight that they do not consider to be worthwhile, leading to the abandonment of efforts directed at weight maintenance.^{14,30} Alternatively, or additionally, repeatedly eating to regulate mood, avoid negative affect, or cope with stressful circumstances is also likely to encourage weight regain.

The strengths of this study include the use of two different methods of data collection (individual and group interviews); more than one method of respondent validation; multiple coding by more than one independent researcher; and the involvement of two independent co-investigators at all stages of the data analysis. Some quantification of the results, in the form of percentages of participants who endorsed each concept, helped with the interpretation of the data.^{31,32} However, the retrospective nature of the design means that the results are subject to recall bias. For example, a greater tendency to evaluate self-worth in terms of weight and shape might have been reported by Regainers as opposed to Maintainers or Healthy Weight participants simply because they had not succeeded in maintaining their new lower weight. There are also acknowledged limitations associated with the use of qualitative methodology.³¹ Nevertheless, the study does suggest some specific hypotheses that are amenable to testing using prospective research designs.

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