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The effect of repeated weighing

on psychological state

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Abstract

Weighing is used as central to the detection and treatment of both obesity and eating disorders and is used by non-clinical individuals as part of their own weight management. The present longitudinal study aimed to examine the effects of repeated weighing on mood, self esteem, body image and eating behaviour. 30 normal weight women took part in the study and completed a set of rating scales before and after either weighing themselves every day for two weeks (weighing condition) or weighing themselves at the beginning and end only of an equivalent period (non-weighing condition). The results indicate that subjects in the weighing condition showed a deterioration in mood in terms of increases in both anxiety and depression and lowered self esteem compared to subjects in the non-weighing condition. The effects of repeated weighing were not related to the subjects' dieting status, but were related to their actual weight change with subjects in the weighing condition whose weight had either remained stable or increased showing increased depression and body dissatisfaction, and subjects whose weight had decreased reporting lowered body dissatisfaction. The results from the present study suggest that weighing may not be as benign a practice as often assumed resulting in a deterioration in the individuals' psychological state. The results are discussed in terms of the negative side effects of treatment and the implications for repeated weighing as detrimental to attempts at weight loss.

Key words: repeated weighing, mood, self esteem, body dissatisfaction, weight loss.

Introduction

Intrinsic to the definition and treatment of both obesity and eating disorders is the process of weighing. An individual is weighed in order to compare his / her weight with that recommended by the health professionals and repeated weighing is used in order to provide both negative and positive feedback during a treatment programme. In addition, weighing is used by many normal weight individuals to facilitate their own weight control. Underlying the use of weighing is the assumption that the individual will benefit from being weighed as this practice will encourage them to adhere to any treatment recommendations. It also assumes that even if weighing has no actual benefits it can do no harm. However, a focus on weighing shifts the desired outcome of any treatment programme from improved health and well being to actual weight loss defined by the number on the scale. In addition, weighing involves a comparison with social norms which may facilitate any existing self perceptions of abnormality. In a recent experimental study, normal weight subjects were weighed and sequentially allocated to either the 'average weight', the 'under weight' or the 'overweight group' according to a fictional height / weight chart (Ogden and Evans, 1996). The results indicated that subjects who were told that they were overweight showed a deterioration in mood and self esteem but no change in body image. This suggests that, even in the short term, weighing may not be the benign intervention it is often assumed to be. In addition, if weighing is related to changes in the individuals' self perception, it may also be detrimental to the aim it is trying to achieve - weight change.

It is possible that weighing in the longer term may have similar negative consequences.

Accordingly, the aim of the present exploratory longitudinal study was to examine the effects of repeated weighing on mood, self esteem, body image and eating behaviour in normal weight

individuals and to examine the role of self reports of dieting and weight change on this effect.

Methodology

Subjects

30 female medical and further education college students took part in the study. Their ages ranged from 16 to 23 years, they were of normal weight and they all had access to weighing scales. Subjects were allocated to either the weighing (n=16) or the non-weighing (n=14) condition.

Design

A repeated measures longitudinal design was used with two conditions. Subjects allocated to the weighing condition were asked to weigh themselves every day for two weeks using their own scales and to record their weight on a weight chart. Subjects allocated to the non-weighing condition were asked to weigh themselves at the beginning and end of the two week period but not to weigh themselves in the interim. All subjects completed a set of rating scales at the beginning (time 1) and end (time 2) of the two week period.

Procedure

Subjects were approached at the colleges and asked to take part in a study to examine seasonal fluctuations in weight. All subjects were then asked if they owned a set of scales and if they would be willing to weigh themselves every day for the next two weeks. Subjects who did not fulfil this criteria were dropped from the study. The remaining subjects were then randomly allocated to either the weighing or the non weighing condition. They were asked to complete the first set of measures and return it to the researcher. The protocol for the two

conditions was then explained to the subjects.

Rating scales

Subjects completed the following rating scales at time 1 and at time 2 for how they were feeling 'right now'.

Mood

Subjects completed the anxiety and depression items of the Profile of Mood states (McNair, Lorr and Droppleman, 1971). A high score reflects higher levels of anxiety and depression.

Self esteem

Subjects completed Rosenberg's self esteem questionnaire (Rosenberg, 1989). The items from this were summated, with a higher score indicating higher self esteem.

Body image

This was measured in two ways:

Subjects completed an abbreviated version of the body dissatisfaction questionnaire (BSQ, Cooper et al, 1987) which was amended to measure state body dissatisfaction. A higher score reflects greater body dissatisfaction.

Subjects also examined a series of body silhouettes (Rozin and Fallon, 1988) and were asked to record which ones best corresponded to their i) present size ii) ideal size. The discrepancy between these two was calculated as a measure of body dissatisfaction.

Eating behaviour

Subjects rated the following statements on a series of 5 point Likert type scales ranging from 'not at all' (1) to 'all the time' (5):

- i) Hungry?
- ii) Full?
- iii) Preoccupied with thoughts of dieting?
- iv) Preoccupied with thoughts of food?
- v) Out of control of my eating?

Profile questions

Subjects were asked to record their present weight and their frequency of weighing per week on average.

Subjects also completed the restrained eating section of the Dutch Eating Behaviour Questionnaire (Van Strien et al, 1986) and recorded their age at time 1 only.

Results

The results were initially analysed to examine differences between the two subject groups in their profile characteristics at baseline using ANOVA (SPSSPC). The results were then analysed using repeated measures ANOVA (SPSSPC) to assess the effect of condition, with condition (weighing vs non-weighing) as the between subject factors and time (time 1 and time 2) as the within subject factor. Finally, the results were analysed to examine the role of dieting (dieters vs non dieters) and weight change (weight gain vs weight stability vs weight

loss) on the subjects' responses to the two conditions.

Profile characteristics

The means for the profile characteristics are shown in table 1.

- Insert Table 1 about here -

The result showed that the two groups were comparable in age and body mass index, but that the weighing group were significantly taller ($F[1,28]=6.21, p<0.01$), heavier ($F[1,28]=4.98, p<0.05$), weighed themselves more frequently per week ($F[1,28]=7.64, p<0.01$) and had a higher score on the restrained eating scale ($F[1,28]=7.85, p<0.001$) than subjects in the non-weighing group.

Effect of condition

The results were then analysed using repeated measures ANOVA (SPSSPC) to examine the effect of condition on measures of mood, self esteem, body image and eating behaviour. Due to the baseline differences in frequency of weighing and restrained eating, these variables were included as covariates (ANCOVA). Because subjects in the two groups were matched in body mass index, height and weight were not included as covariates.

Mood

The means for mood ratings are shown in table 2.

- Insert table 2 about here -

The results showed no significant main effect of condition for either anxiety or depression. However, the results showed a significant condition by time interaction for both anxiety ($F[2,27]=7.98, p<0.01$) and depression ($F[2,27]=9.49, p<0.005$). The means indicate that subjects in the weighing condition became more anxious and depressed over the two week period compared to subjects in the non-weighing condition, indicating that repeated weighing was related to a deterioration in mood.

The means for self esteem and body image are shown in table 3.

-Insert Table 3 about here -

Self esteem

The results showed no significant main effect of condition for self esteem, but showed a significant condition by time interaction ($F[2,27]=5.14, p<0.05$). The means suggest that subjects in the weighing condition showed a greater deterioration in self esteem over the two week period compared to subjects in the non-weighing condition.

Body image

The results for body dissatisfaction as measured by the body shape questionnaire (BSQ) showed no main effect of condition or condition by time interaction. The results for body dissatisfaction as measured by a discrepancy between present and ideal body shape showed a significant main effect of condition ($F[1,28]=5.89, p<0.05$) with subjects in the weighing group indicating a greater discrepancy than subjects in the non-weighing group. However, the

results showed no condition by time interaction.

Eating behaviour

The means for the measures of eating behaviour are shown in table 4.

- Insert Table 4 about here -

The results for eating behaviour showed no significant main effects of condition and no significant condition by time interactions.

Role of dieting

The results were then analysed to examine the role of dieting on the effect of repeated weighing. Using a median split on the restrained eating scale of the DEBQ, subjects were divided into dieters or non dieters. This resulted in four groups: non weighing dieters (n=4), non weighing non dieters (n=10), weighing dieters (n=12) and weighing non dieters (n=4).

The results were then analysed using repeated measures ANOVA with frequency of weighing as the covariate and dieting status as the between subject factor. The results showed no significant dieting by condition by time interactions suggesting that dieting status at time 1 did not influence the subjects' responses to repeated weighing.

Role of weight change

The results were then analysed to examine the role of weight change over the two week period on the effect of repeated weighing. Subjects were divided into three groups according to whether they has lost weight (n=8), showed no weight change (n=12) or gained weight (n=10) over the two week period. These were distributed between the two conditions as follows: in

the weighing condition: lost weight (n=5), no change (n=4), gained weight (n=7); in the non-weighing condition: lost weight (n=3), no change (n=8), gained weight (n=3). The results were then analysed with frequency of weighing at time one and restrained eating as covariates and weight change group as the between subject factor. The results showed no significant weight change group by condition by time interaction for anxiety, self esteem, body dissatisfaction as measured by the body silhouettes or eating behaviour. However, the results showed a significant weight change group by condition by time interaction for depression ($F[2,27]=3.31$, $p<0.05$) and body dissatisfaction as measured by the BSQ ($F[2,27]=6.35$, $p<0.01$). For depression, the results indicated that subjects in the non-weighing condition showed stable ratings of depression from time 1 to time 2 regardless of weight change. However, whereas subjects in the weighing condition who had lost weight showed no change in depression, subjects whose weight had either remained stable or increased showed an increase in their depression ratings. For body dissatisfaction, the results showed that all subjects in the non weighing condition showed consistency in their ratings of body dissatisfaction regardless of their weight change. However, subjects in the weighing condition who had lost weight reported decreased body dissatisfaction and subjects who had either gained weight or showed no weight change reported an increase in their body dissatisfaction. The means for body dissatisfaction and depression are shown in table 5.

- Insert table 5 about here -

Discussion

The aim of the present exploratory study was to examine the effect of repeated weighing on subjects' ratings of mood, self esteem, body image and eating behaviour.

The results indicate that subjects who weighed themselves everyday for two weeks reported a deterioration in mood in terms of increases in both anxiety and depression compared to subjects in the non-weighing group. In addition, repeated weighing was also related to decreased self esteem. This supports the prediction that weighing may have negative consequences for the individuals' self perception and supports the results from the previous experimental study which reported changes in depression and self esteem following short term comparison to social norms of weight (Ogden and Evans, 1996). Perhaps, repeated weighing encourages the individual to focus on their body weight which exacerbates any existing self criticisms resulting in changes in mood and self esteem. This has implications for the use of weighing as central to the treatment of both obesity and eating disorders and suggests that weighing may have negative consequences. It could be assumed that the response to weighing would be mediated by body image, with mood deterioration and lowered self esteem reflecting increased body dissatisfaction. However the results from the present study found no changes in body dissatisfaction and in addition, indicated that changes in psychological state were not related to the individual's dieting status. These results also support those of the previous experimental study, whereby comparisons to social norms of weight had no effect on body dissatisfaction (Ogden and Evans, 1996). Perhaps, repeated weighing has negative consequences for all individuals regardless of their existing concerns for weight and shape and has a direct effect on mood and self esteem, not mediated by body dissatisfaction - repeated weighing may be influential enough to effect everyone. Alternatively, this absence of an effect for dieting in the present study may simply be a consequence of the small numbers of subjects. Further research is needed to examine this explanation.

The results from the present study also suggest that changes in depression and body

dissatisfaction in the weighing group were related to their actual change in body weight. The results indicate that increased depression was greatest in subjects whose weight either remained stable or increased. Furthermore, subjects who lost weight showed a decrease in their body dissatisfaction, whereas those who gained weight or whose weight remained stable showed an increase. Perhaps repeated weighing encourages the individual to focus on any changes in weight and to attempt to understand these changes in terms of their own behaviour. Accordingly, weight gain or no weight change may be understood in terms of a failure and weight loss as a success resulting in changes in mood and satisfaction with body shape. This suggests that repeated weighing may only have selective negative consequences which influence those individuals who do not show the desired outcome of treatment.

Although, the numbers in the present study were small, and the follow up period was relatively small, the results have implications for the use of repeated weighing in treatment programmes and by non clinical individuals. Weight feedback is intended to encourage adherence to a treatment regimen, however, it may be detrimental to the individuals' psychological state. This may be exacerbated if the individual's weight either remains stable or increases. This is particularly important in the light of research examining weight fluctuation and pre menstrual water retention, as such changes in weight would be detected by repeated weighing and result in changes in psychological state (Heatherton, Polivy and Herman, 1991). Such deterioration in mood, self esteem and body dissatisfaction, may be unpleasant for the patient being treated and is in contradiction with the medical emphasis on 'do no harm'. However, these changes may also have detrimental consequences for the goals of obesity treatment - weight loss. Research into overeating and dieting suggests that lowered mood and self esteem may contribute towards the breakdown of food restriction characteristic of dieters (Herman and

Polivy, 1984). It is possible that, in contradiction with its aims, repeated weighing may create changes in psychological state which are not only unpleasant for the individual but also facilitate overeating and consequently undermine attempts at weight loss. Further longer term research is needed to examine this possibility.

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Table 1: Profile characteristics (means and standard deviations)

	Non-weighing (n=14)	Weighing (n=16)	F value	p value
Age (yrs)	19.7 ± 1.5	20.4 ± 1.8	1.19	NS
Freq. weighing (per wk)*	0.85 ± 0.9	2.0 ± 1.7	7.64	<0.01

Weight (kg)*	60.68 ± 7.2	66.05 ± 6.02	4.98	<0.05
Height (m)*	1.53 ± 0.1	1.6 ± 0.1	6.21	<0.01
BMI	25.73 ± 2.2	26.00 ± 4.0	0.05	NS
Restrained eating*	2.7 ± 1.25	3.72 ± 0.72	7.85	<0.001

* significant main effect of condition (p<0.05)

Table 2: Mood - anxiety and depression (means and standard deviations)

	Non-weighing (n=14)		Weighing (n=16)	
	time 1	time 2	time 1	time 2

Anxiety*	15.93 ± 6.7	14.36 ± 6.8	12.44 ± 3.6	15.88 ± 5.49
Depression*	18.86 ± 7.6	17.79 ± 6.9	16.06 ± 2.8	21.25 ± 7.5

* significant condition by time interaction (p<0.01)

Table 3: Self esteem and body image (means and standard deviations)

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	Non-weighing (n=14)		Weighing (n=16)	
	time 1	time 2	time 1	time 2
Self esteem*	29.86 ± 4.3	29.93 ± 3.7	28.8 ± 3.9	26.6 ± 4.6
Body dissatisfaction				
BSQ	19.43 ± 7.9	19.64 ± 8.0	23.13 ± 4.6	25.1 ± 6.3
Discrepancy#	0.71 ± 0.8	0.72 ± 0.8	1.56 ± 0.96	2.13 ± 1.3

* significant condition by time interaction (p<0.05)

significant main effect of condition (p<0.05)

Table 4: Eating behaviour (means and standard deviations)

	Non-weighing (n=14)		Weighing (n=16)	
	time 1	time 2	time 1	time 2
Hunger	3.0 ± 1.2	3.1 ± 1.3	3.13 ± 1.0	3.0 ± 1.3
Fullness	3.0 ± 1.3	3.0 ± 1.24	2.94 ± 0.6	3.13 ± 1.0
Preoccupied with dieting	2.29 ± 1.6	2.64 ± 1.7	3.13 ± 1.1	3.69 ± 1.4
Preoccupied with food	3.0 ± 1.5	3.0 ± 1.5	2.87 ± 1.4	3.5 ± 1.5
Out of control of eating	2.57 ± 1.3	2.5 ± 1.4	2.94 ± 0.9	3.25 ± 1.6

Table 5: Role of weight change in responses to weighing vs non-weighing

	Non-weighing (n=14)						Weighing (n=16)					
	weight loss (n=3)		no change (n=8)		weight gain (n=3)		weight loss (n=5)		no change (n=4)		weight gain (n=7)	
	t1	t2	t1	t2	t1	t2	t1	t2	t1	t2	t1	t2
BS	18.7	19.3	20.1	20.3	18.3	18.3	22.0	19.8	21.8	24.0	24.7	29.4
Q*	± 4.5	± 4.7	± 8.2	± 8.9	± 12.3	± 10.4	± 3.1	± 1.6	± 6.6	± 7.4	± 4.3	± 4.9
Dep	16.3	16.3	18.1	17.0	23.3	21.3	16.6	16.0	18.3	22.8	14.4	24.1
*	± 2.1	± 4.0	± 5.5	± 4.2	± 14.7	± 14.4	± 1.9	± 3.0	± 2.9	± 9.2	± 2.6	± 7.6

* significant weight change group by condition by time interaction ($p < 0.05$).