

PAPERS AND ORIGINALS

Jolly fat: relation between obesity and psychoneurosis in general population

A H CRISP, B McGUINNESS

British Medical Journal, 1975, 1, 7-9

Summary

The relation between fatness and aspects of psychological status was investigated in a representative sample (339 men and 400 women) of a middle-aged suburban population. A significant positive relation was found between substantial obesity and low levels of anxiety (in men and women) and depression (in men).

Introduction

The contribution that experience, including psychological and social aspects, makes to the development and maintenance of obesity is complex and probably highly variable.

Few general population studies have been done. In the mid-downtown Manhattan study¹ little association was found between obesity and psychiatric status although there has long been a clinical view that the pyknic shape is associated with an increased tendency to develop manic depressive psychosis. No such association was found in a recent clinical study² of the body build and fatness characteristics of a large population of psychiatric patients. Meanwhile other workers³⁻⁵ have reported that obese patients attending medical clinics were characterised by normal levels of neuroticism as measured by the Cornell Medical Index. Silverstone,⁵ however, reported that men who were 45% or more above "ideal" weight reported less neuroticism than others, and Simon⁶ had earlier found much less depression among a group of obese service personnel than among their non-obese colleagues. Meanwhile, the National Child Development Survey⁷⁻⁸ found that both male and female adolescent aggressiveness is rated by teachers as higher in fat people.

Study

This report concerns certain psychological characteristics that are related to each person's weight and fatness.⁹ The population sample comprised those aged 40-65 years who were registered with a group practice in South-west London, but included each subject's spouse even if outside the nuclear age range. The investigation was conducted within the framework of a battery of screening tests already being applied by the department of clinical epidemiology and social medicine of St Thomas's Hospital. Alternate elements (subject or subject plus spouse) were taken from an alphabetical list and these were invited to attend for screening.

Measurements

Body weight in indoor clothes was measured by accurate scales, and height was measured in stockings feet.

Obesity index (relative weight)—We needed an index of obesity based on weight and height that was (a) independent of height and maximally related to adiposity as measured by skinfold thickness, (b) easily coded for computer processing, and (c) interpretable. The index chosen was the general power index $\text{weight}/(\text{height})^P$ described by Benn,¹⁰ in which the exponent P is estimated from the linear regression of weight on height. For men P was estimated as 2.0, giving Quetelet's index¹¹ and for women P was 1.6. Scaling factors that transformed the indices into expressions of relative weight within the sample were computed for both sexes. Comparisons of the sample weight-for-height and the mean standards of Kemsley *et al*¹² and the Metropolitan Life Insurance Company¹³ indicated that our South-west London suburban population was distinguished in having a greater gradient of weight against height and in having higher standards; this latter was true even when adjustments were made to the Kemsley standards to allow for variation with age.

Adiposity was estimated from the sum of two skinfold thicknesses, triceps and subscapular, and a logarithmic normalising transformation was used¹⁴: $\text{adiposity} = \log_{10} (\text{sum of skinfolds} - 0.36)$. The correlations obtained between the measures showed that relative weight and adiposity, which are both highly related, were distributed independently of height and age in both sexes.¹⁵

Middlesex Hospital questionnaire (MHQ)—A brief self-rating inventory intended to cover the full clinical range of neurotic illness and also some neurotic personality characteristics provided measures on six scales allowing scores to range from 0 to 16 in each one. The scales were: anxiety, phobia, obsession, somatic anxiety, depression, hysteria. The first five scales were validated in an initial study¹⁶ and were subsequently found^{9, 17} to produce results that discriminate

Department of Psychiatry, St George's Hospital Medical School, London SW17

A H CRISP, MD, FRCPsych, professor of psychiatry
B McGUINNESS, BSc, research assistant

clearly between normal people, psychiatric outpatients, and inpatients with psychoneurotic illness.

Results

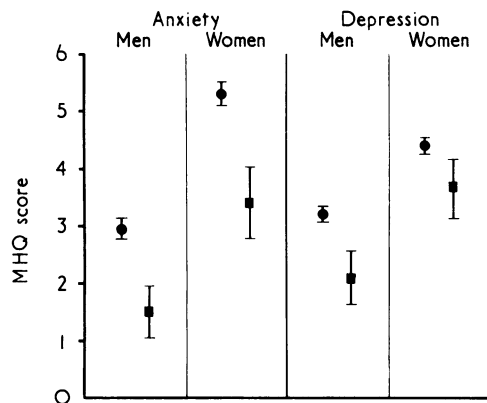
Seventy-two per cent of the population approached agreed to enter the screening programme. Of the 790 people who were then offered the MHQ, 778 completed it. The proportion of scores spoilt through incomplete questionnaires ranged from under 2% (depression scale) to under 4% (obsessional scale). The transcribed weight, height, and skinfold thickness data were inadequate in three people. The remaining 739 people, for whom all measures were available, remained in the study.

The 339 men and 400 women were analysed separately and each divided into two groups. Men over 20% above the standard weight-for-height yielded an obese group comprising only 5% of the male population. There were more obese women, and a more usual cut-off point of more than 40% above such standard weight yielded a female obese population comprising 3.3% of the total women. The cut-off points on the adiposity index were taken to correspond to a mean skinfold thickness of 22 mm and 32 mm in men and women respectively.

Analysis of variance showed that for men the obese and normal groups were similar in age and height and differed significantly, as expected, in weight, relative weight, and adiposity as measured by skinfold thickness (table I). Obese men (average weight 95.8 kg) averaged 21 kg more than non-obese men; obese women (average weight 105 kg) averaged 41 kg more than non-obese women.

The groups were compared also by analysis of variance in respect of their scores on the MHQ. Positive differences emerged for men on the anxiety and depression scales, the obese group having significantly lower means on both (fig 1). Significant differences were found between the two groups of women in anxiety but not depression, in which, however, the same trend existed. Since the distributions of both anxiety and depression scales are heavily skewed in a normal population⁹ and in these comparisons the variances were not homogeneous and the group sizes different, we thought that despite the robustness of the analysis the assumptions underlying it were violated sufficiently to necessitate a further test on the data. All MHQ scales were therefore examined by the median test extension of χ^2 .¹⁸

The median tests essentially confirmed the results obtained from the analysis of variance, and showed, within the limits of the validity



Mean (\pm SE) MHQ scores for obese (■) and normal (●) groups (obesity defined from relative weight). There were 17 obese and 322 normal men and 18 obese and 387 normal women

Comparison of normal and obese groups. Results are means \pm SE

	Men (n = 322)			Women (n = 387)		
	Normal	Obese	P value	Normal	Obese	P value
Height (cm)	172 \pm 6.8	173 \pm 8.3	NS	158 \pm 6.0	161 \pm 4.8	<0.05
Weight (kg)	75.1 \pm 10.2	96.0 \pm 9.0	<0.001	63.5 \pm 9.9	105.2 \pm 9.0	<0.001
Relative weight	98 \pm 10.7	124 \pm 3.0	<0.001	97.9 \pm 14.5	155.8 \pm 9.3	<0.001
Triceps skinfold (mm)	9.8 \pm 3.9	14.5 \pm 6.0	<0.001	20.7 \pm 6.4	35.8 \pm 4.6	<0.001
Subscapular skinfold (mm)	15.6 \pm 6.5	29.3 \pm 7.9	<0.001	18.6 \pm 8.4	39.2 \pm 1.3	<0.001
Adiposity	1.4 \pm 0.2	1.6 \pm 0.1	<0.001	1.6 \pm 0.16	1.87 \pm 0.03	<0.001
Age	51.9 \pm 7.5	53.4 \pm 7.8	NS	51.5 \pm 7.8	47.6 \pm 6.8	NS

NS = Not significant.

of the MHQ, that for men being overweight was associated with a reported absence of both free-floating anxiety and depression. In contrast, phobic anxiety and somatic complaint were distributed equally between overweight men and those of normal weight.

While no significant difference could be found between the women in respect of central tendency of the anxiety scale, re-examination of the data showed that nobody was both obese and anxious—that is, had a score of 8 and above on this scale⁹ whereas 21% of the normal women scored above 8 on the anxiety scale. This difference was found to be significant ($P < 0.05$) on the Fisher exact test.¹⁸ When the MHQ characteristics of the population were related to the skinfold thickness index the association between female fatness and low anxiety (mean score (\pm SD) 4.1 \pm 3.2 in obese women compared with score of 5.4 \pm 3.5 in normal women) achieved significance at the 5% level.

Discussion

In a middle-aged sample of the general population we found a relation between certain psychoneurotic characteristics and the degree of obesity. Obese people (men who were 20% above standard weight, and women who were 40% above standard weight) were much less anxious and, in the case of men, much less depressed than the rest of the population.

These findings agree with those of Silverstone⁵ and Simon,⁶ who, however, confined their studies to men and also the observations of Shakespeare, who saw fat men at least as more contented than others. Given some universality in this association, what are its origins? Is one quality dependent on the other or are both codependent on some more distant factor? Is the chemistry of obesity or overeating incompatible with anxiety and depression? Does the role of the obese person allow or demand apparent contentment? Many clinicians have stated that overeating may help to console some people, especially, perhaps, infants and children who are insecure and lonely. If so which people, and is it the immediate act of overeating or the long-term consequence of obesity that is the most protective? Or may both factors operate? How do genetic and cultural influences impinge on this association between mood and fatness in the early months of life, when the propensities for both obesity and neurosis are being finally shaped? Such questions remain largely unanswered in terms of their relevance to the general population of obese adults. Indeed, many investigations have suffered from being conducted on highly self-selected obese populations.

Thus both Bruch¹⁹ and Stunkard²⁰ reported a high incidence of depression in obese clinic populations after prolonged dieting and weight loss. Bruch wondered whether the loss of oral comfort might be important but both authors were cautious in interpreting their findings. Other authors,^{4 21-23} usually studying a few obese patients losing major amounts of weight under close supervision, have found that depression is uncommon.

AFFECTIVE AND BEHAVIOURAL CHANGES

More recently investigators have studied a wider range of affective and behavioural characteristics in such populations. Thus Robinson *et al*.⁹ report many psychotic reactions in some

obese patients losing substantial amounts of weight. Glucksman and Hirsch³⁰ noted that body image disturbances persisted among the chronically obese despite major weight reductions. Others^{22 31-33} have reported increased sexual activity in their patients after major weight loss, which sometimes seemed to rekindle latent social problems. Glucksman and Hirsch³² describe an increase in anxiety and depression during and after weight loss, while an initial increase in hostile aggressive behaviour disappeared once the subjects were stabilised at the lower weight and were again eating normally. They and Crisp³¹ suggest that there are both non-specific symptoms due to starvation³⁴ and also specific symptoms which arise in the fat-reduced obese person and are related to individual character structure and the pattern of personal relationships.

Meanwhile others^{31 33} have also found that obese patients, after major weight loss achieved by dieting combined with psychotherapy were characterised not so much by depression as by a loss of the capacity to deny their interpersonal problems. When these were considerable and personal relationships particularly barren then relapse rapidly ensued. These workers thought that there was a critical weight threshold below which such denial was no longer achieved and that this was about 25% or so above normal weight. The existence of such a weight threshold was also proposed by Glucksman and Hirsch.³² Solow and Silverfarb³⁵ and Kalucy and Crisp³⁶ found that massively obese people, losing weight after ileojejunum bypass, showed little tendency to develop depression but there were often major changes in their life styles which affected people living with them. They concluded that food deprivation, to which these obese patients losing weight were not exposed, might be an important factor generating depression in those losing weight through restriction of diet.

Though some clinical reports contradict each other, the main themes that emerge are that both obesity as such and also the dietary habits—for example, periodic overeating—of obese people may sometimes at least be a protective mechanism against the experience and display of anxiety and depression.

The limitations of data gathered by questionnaire are well known. Nevertheless, the data we distilled from our questionnaire on anxiety and depression seems to have validity since they were collected on a standardised questionnaire and since the population as a whole responded in a way that differentiated it from psychoneurotically ill populations.⁹ Furthermore, the response to clinical questions of this kind forms the basis of much judgment in these areas. It might be argued that the obese population in particular responded with a particular "social desirability set," and we do not deny that this may have contributed to their performance. Indeed, this would be consistent with our proposition that middle-aged obese men may not only be less likely to experience anxiety and depression than others but may also be less likely also to reveal it to others; the same holds true for women for anxiety but not for depression.

We are indebted to Professor Walter Holland and his team, who welcomed us in their survey and gave much practical help. Drs Williamson, Sharpe, Barley, and Raeburn, the general practitioners concerned, have helped us greatly, as have all those in the practice who are the subjects of this investigation. We are most grateful to them all.

References

- Moore, M A, Stunkard, A J, and Srole, L, *Journal of the American Medical Association*, 1962, 181, 962.
- Crisp, A H, Stonehill, E, and Koval, J, in *Recent Advances in Obesity Research*, ed A Howard, p 199. London, Newman, 1975.
- McCance, C, Academic DPM Dissertation, University of London, 1961.
- Silverstone, J T, and Solomon, T, *Journal of Psychosomatic Research*, 1966, 9, 249.
- Silverstone, J T, *Proceedings of the Royal Society of Medicine*, 1968, 61, 371.
- Simon, R I, *Journal of the American Medical Association*, 1963, 183, 208.
- Douglas, J W B, Ross, J M, and Simpson, H R, *All our Future: A longitudinal study of secondary education*. London, 1969, Peter Davies Ltd.
- Crisp, A H, et al, *Journal of Psychosomatic Research*, 1970, 14, 313.
- Crisp, A H, and Priest, R G, *British Journal of Psychiatry*, 1971, 119, 385.
- Benn, R T, *British Journal of Preventive and Social Medicine*, 1971, 25, 42.
- Khosla, T, and Lowe, L R, *British Journal of Preventive and Social Medicine*, 1967, 21, 122.
- Kemsley, W F F, Billewicz, W C, and Thomson, A M, *British Journal of Preventive and Social Medicine*, 1962, 16, 189.
- Metropolitan Life Assurance Company Statistical Bulletin*, 1959, 40, Nov-Dec.
- Edwards, D A W, et al, *British Journal of Nutrition*, 1955, 9, 133.
- Billewicz, W C, Kemsley, W F F, and Thomson, A M, *British Journal of Preventive and Social Medicine*, 1962, 16, 183.
- Crown, S, and Crisp, A H, *British Journal of Psychiatry*, 1966, 122, 917-923.
- Crown, S, and Crisp, A H, *Manual of the Middlesex Hospital Questionnaire (MHQ)*. London, 1970.
- Siegel, S, *Non Parametric Statistics: For Behavioural Sciences*. New York, McGraw-Hill, 1956.
- Bruch, H, New York, Norton, 1957.
- Stunkard, A J, *American Journal of Medicine*, 1957, 23, 77.
- Spencer, H, Lewis, I, and Samackson, J, *American Journal of Medicine*, 1966, 40, 27.
- Kollard, C, and Aitkenson, R, *Psychosomatic Medicine*, 1966, 28, 227.
- Ryneerson, E, *Proceedings of Staff Meeting Mayo Clinic*, 1955, 30, 236.
- Shipman, W G, and Plesset, M R, *Archives of General Psychiatry* (Chicago) 1963, 8, 530.
- Biggers, W H, *Archives of General Psychiatry*, 1966, 14, 218.
- Bloom, W L, *Metabolism*, 1959, 8, 214.
- Drenick, E J, et al, *Journal of the American Association*, 1964, 187, 100.
- Duncan, C G, et al, *American Journal of Medical Science*, 1963, 245, 515.
- Robinson, S, and Winnik, H, *Archives of General Psychiatry*, 1973, 29, 559.
- Glucksman, M L, and Hirsch, J, *Psychosomatic Medicine*, 1969, 31, 1.
- Crisp, A H, *Journal of Psychosomatic Research*, 1967, 11, 117.
- Glucksman, M L, and Hirsch, J, *Psychosomatic Medicine*, 1968, 30, 1.
- Crisp, A H, and Stonehill, E, *Journal of Psychosomatic Research*, 1970, 14, 327.
- Keys, A, et al, *The Biology of Human Starvation*. Minneapolis, University of Minnesota Press, 1950.
- Solow, C, Silverfarb, P M, and Swift, K, *New England Journal of Medicine*, 1974, 290, 300.
- Kalucy, R S, and Crisp, A H, *Journal of Psychosomatic Research*, 1974, 18, 465.