Obesity Digest

In this regular section, Matt Capehorn picks out recent key papers published in the area of obesity. To compile the digest, a PubMed search was performed for the 3 months ending January 2015 using a range of search terms relating to obesity. Articles have been chosen on the basis of their potential interest to healthcare professionals and are rated according to readability, applicability to practice and originality.

Can you be fit and fat?

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Is there such a thing as healthy obesity? Current evidence suggests that obesity in adults is associated with an increased risk of a number of chronic conditions, such as hypertension and coronary heart disease, cerebrovascular disease, type 2 diabetes and some cancers (Kopelman, 2007), and that weight loss in the obese and overweight conveys a number of clinical health benefits (Avenell et al, 2004). However, this does not explain how some individuals can be obese, or even morbidly obese, and yet do not appear to have any comorbidities. So, is there a form of "simple obesity" that appropriately describes the "fit and fat" individuals who, despite their weight, are metabolically healthy?

The concept of "metabolically healthy obesity" is of importance, as it might add support for us as clinicians to decide, or even prioritise, management based on the presence of comorbidities or metabolic risk factors, rather than weight alone. The concept is not that unreasonable given that we can have metabolically unhealthy thin people.

In a meta-analysis published in the *Annals of Internal Medicine*, Kramer et al (2013) looked at eight different studies with a total of more than 61 000 participants and, unsurprisingly, found that the rate of cardiovascular events was lowest in the metabolically healthy normal-weight individuals, and that being metabolically unhealthy put people at increased risk of cardiovascular disease even if they were in the normal BMI range. However, perhaps surprisingly, there was little difference between metabolically healthy overweight or obese individuals and metabolically healthy normal-weight individuals. However, in the studies with more than 10 years' follow-up, the metabolically healthy obese group were found to have an increased risk of death and cardiovascular events compared with those of a normal weight. Furthermore, the authors found that some of the studies included metabolically unhealthy individuals in the normal-weight groups, which influenced their results to suggest that one could be overweight and just as healthy.

In a new study (summarised alongside), Ferrer et al investigated metabolically healthy obese individuals who were due to undergo bariatric surgery. Although the number of participants was small, in-depth analysis of hormonal and biochemical markers of metabolic health indicated that these individuals were merely less metabolically imbalanced than obese people with comorbidities, and that the concept of metabolically healthy obesity is not supported.

The evidence is still conflicting and not beyond doubt, but we should not forget that weight is clearly a major factor when combined with metabolic abnormalities, and there is increasing evidence to suggest that obesity is indeed a disease process in itself. For now, we should not allow our patients to consider themselves fit and fat. ■

Avenell A, Broom J, Brown TJ et al (2004) Systematic review of the long-term effects and economic consequences of treatments for obesity and implications for health improvement. *Health Technol Assess* **8**: 1–182

Kopelman P (2007) Health risks associated with overweight and obesity. *Obes Rev* **8**(Suppl 1):13–7

Kramer CK, Zinman B, Retnakaran R (2013) Are metabolically healthy overweight and obesity benign conditions? A systematic review and meta-analysis. *Ann Intern Med* **159**: 758–69

Obes Surg

Metabolically healthy obesity: A misnomer?

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
Originality	✓✓✓

1. The authors of this study investigated the so-called metabolically healthy obesity (MHO) phenomenon in 32 obese people who had been selected to undergo bariatric surgery.
2. Of the participants, 10 had the MHO phenotype, defined as the absence of diabetes or dyslipidaemia despite a BMI of ≥40 kg/m^2, 15 had dyslipidaemia but no diabetes and seven had both diabetes and dyslipidaemia.
3. Regarding measures of satiety, ghrelin and adiponectin levels were similar in the three groups; however, leptin levels were significantly lower in the MHO group.
4. Triglyceride, cholesterol and apolipoprotein levels were significantly lower in the MHO group, whereas phospholipid and non-esterified fatty acid levels were not.
5. Regarding measures of insulin resistance, blood glucose levels were higher in the group with diabetes and dyslipidaemia; however, insulin levels and the homeostasis model assessment of insulin resistance were similar in the three groups.
6. Compared with a cohort of normal-weight controls, all of these obese participants had increased gene expression of leptin and reduced expression of adiponectin, insulin receptor and glucose receptor-4.
7. These findings, and the fact that the majority of these parameters normalised 1 year after bariatric surgery, lead the authors to conclude that so-called MHO individuals are not metabolically healthy; rather, they are merely less metabolically imbalanced than obese people with comorbitities.

Ferrer R, Pardina E, Rossell J et al (2014) Morbidly "healthy" obese are not metabolically healthy but less metabolically imbalanced than those with type 2 diabetes or dyslipidemia. *Obes Surg* 17 Dec [Epub ahead of print]

Obes Surg

Bariatric surgery vs non-surgical weight loss for obstructive sleep apnoea

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
Originality	✓✓✓✓

1. In this systematic review and meta-analysis, the authors compared bariatric surgery and non-surgical weight loss methods in terms of their effects on obstructive sleep apnoea (OSA).
2. A total of 19 bariatric surgery studies (n=525) and 20 non-surgery studies (n=825) were evaluated. Non-surgical techniques primarily comprised diet and exercise, as well as, occasionally, pharmacotherapy or behavioural counselling.
3. Surgery resulted in significant reductions in BMI (weighted mean difference [WMD], 14.2 kg/m^2). Non-surgical techniques resulted in smaller, but still significant, reductions (WMD, 3.1 kg/m^2).
4. Both types of intervention were also associated with reductions in apnoea–hypopnoea index; however, the surgical techniques again had a numerically greater effect (WMD, 29.6 vs 11.4 episodes per hour).
5. The authors list a number of mechanisms, beyond weight loss, that could account for surgery's effects on OSA, including alterations in cytokine and adipokine profiles, insulin resistance, gut hormone release and eating behaviours.

Ashrafian H, Toma T, Rowland SP et al (2014) Bariatric surgery or non-surgical weight loss for obstructive sleep apnoea? A systematic review and comparison of meta-analyses. *Obes Surg* 25 Dec [Epub ahead of print]

Obesity

Meal time does not alter effects of alternate-day fasting

Readability	✓✓✓
Applicability to practice	✓✓✓✓
Originality	✓✓✓✓✓

1. These authors evaluated whether different meal times during the fast days of an alternate-day fasting (ADF) protocol affected diet adherence, weight loss or cardiovascular risk factors.
2. In total, 74 obese people underwent an ADF diet, in which they alternated days of *ad libitum* eating with days eating only 25% of their baseline energy needs. On the fast days, they were randomised to eat at either lunch time, dinner time or in three mini-meals.
3. Dropout rates were similar in the three groups, at around 20%, and the completers adhered to the calorie goals on around 90% of fast days in all groups.
4. Body weight decreased to a similar extent, by around 4 kg, in the three groups over the 8-week protocol. Visceral fat mass also declined by about 0.1 kg in all groups.
5. Plasma lipid levels and measures of insulin resistance remained unchanged in all groups.
6. The authors conclude that the timing of the fast-day meal in an ADF diet does not affect the diet's efficacy, and this flexibility may increase tolerability and adherence.

Hoddy KK, Kroeger CM, Trepanowski JF et al (2014) Meal timing during alternate day fasting: impact on body weight and cardiovascular disease risk in obese adults. *Obesity (Silver Spring)* **22**: 2524–31

Obes Surg

Vitamin supplementation after gastric bypass: Survey of UK practice

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
Originality	✓✓✓✓✓

1. There are as yet no national guidelines in the UK, and NHS Trusts have been required to develop their own local guidelines.
2. These authors surveyed 35 bariatric surgery centres in the UK and compared post-gastric bypass prescribing practice against the official guidelines of the American Association of Clinical Endocrinologists (AACE).
3. Whereas AACE guidelines recommend twice-daily vitamin supplementation in order to increase absorption, only seven hospitals prescribed twice-daily regimens.
4. Twenty-five hospitals prescribed calcium and vitamin D supplements; however, this was not always in twice-daily doses, and no hospital prescribed the AACE-recommended calcium citrate, which has a greater bioavailability. Only one centre prescribed iron supplements as recommended in the guidelines.
5. Both branded and non-branded formulations met AACE guidelines for composition; however, the latter have not been evaluated in terms of bioavailability and absorption rates, although they are considerably cheaper.

Dunstan MJ, Molena EJ, Ratnasingham K et al (2015) Variations in oral vitamin and mineral supplementation following bariatric gastric bypass surgery: a national survey. *Obes Surg* **25**: 648–55

"The authors conclude that the timing of the fast-day meal in an alternate-day fasting diet does not affect the diet's efficacy, and this flexibility may increase tolerability and adherence."

Diabetes Obes Metab

Metformin treatment in obese children

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓
Originality	✓✓✓

1. Studies in obese adults without diabetes have shown that, in addition to its effects on body weight, metformin causes a reduction in energy intake.
2. These authors sought to determine whether metformin had the same effects in a cohort of 84 obese children, of whom 45 received metformin and 39 received placebo in addition to diet and lifestyle advice.
3. After 6 months of treatment, the metformin group had a reduction in BMI, compared with an increase in the placebo group (mean change, –0.78 kg/m^2 vs +0.32 kg/m^2; P=0.006).
4. Compared with baseline, children in the metformin group had a reduction in energy intake of 105 kcal at a test lunch meal, whereas the placebo group had an increase of 144 kcal (P=0.03).
5. Unlike placebo, metformin also reduced visual analogue scale hunger scores (mean change from baseline, –1.5 vs +18.6; P=0.013) and ratings of fullness (mean change, +10.1 vs –12.8; P=0.01) after a breakfast milkshake.

Adeyemo MA, McDuffie JR, Kozlosky M et al (2015) Effects of metformin on energy intake and satiety in obese children. *Diabetes Obes Metab* **17**: 363–70