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Health: Mostly Food and Eating

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An independent academic psychologist, based in England, who has written extensively on different areas of psychology with an emphasis on the critical stance towards traditional ideas.

A complete listing of his writings at http://psychologywritings.synthasite.com/. See also material at https://archive.org/details/orsett-psych.

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1. EATING DISORDERS IN THE ARAB WORLD

Pike et al (2014) observed that eating disorders appeared to be increasing in the Arab world, "also in concert with increasing industrialisation, urbanisation, and globalisation. The tendencies that predispose both men and women to developing an eating disorder, namely unhealthy dieting practices, restrictive eating, body preferences rooted in the 'thin ideal', bodyweight and body-shape dissatisfaction, and weight misperception, are increasing in many parts of the Arab region" (Melisse et al 2024 p388). There are large variations in the risk of eating disorders in different Arab countries (Melisse et al 2024).

Melisse et al (2024) updated the evidence with a review of studies published in English between 2019 and mid-2024. Twenty-two relevant studies were found, with over half from Lebanon, and no research from Iraq, Jordan, Kuwait, Syria, United Arab Emirates, and Qatar.

Overall, lifetime prevalence of any eating disorder was 6%, and 3% for the past twelve months. The most common eating disorder was Binge Eating Disorder. Between 24-35% prevalence of a high risk of an eating disorder was found. High risk was defined as characteristics like body shape dissatisfaction, and disordered eating behaviours that did not reach a clinical diagnosis cut-off point.

Adolescents were viewed as a high risk group, along with higher socio-economic status individuals, and it was associated with "Westernisation" (though not all studies confirmed the latter).

The main change in this review from previous research was that studies were now using validated self-report assessment tools, often with appropriate norms for the culture. Eight of the 22 studies were validation studies for eating disorder measures in a particular culture. Melisse et al (2024) had "greater confidence" in their findings than previous estimates. But data were lacking for many countries.

The studies varied on key methodological aspects like:

i) Sample make-up (eg: students; young adults; adolescents; males and/or females).

ii) Inclusion of specific sub-groups (eg: homosexual men; pregnant women).

iii) Assessment measure used (eg: "Dutch Eating

Behaviour Questionnaire"; "Binge Eating Scale"; "Body Shape Questionnaire").

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2. PROBLEM WITH BMI

Body mass index (BMI) is calculated as weight (in kg) divided by height squared (in metres) to give a figure in kg/m^2.

Rubino et al (2025) argued for a revised definition of obesity based on "how excess body fat, a measure called adiposity, affects the body, rather than relying only on body mass index (BMI), which links a person's weight to their height. They propose two categories: pre-clinical obesity, when a person has extra body fat but their organs work normally, and clinical obesity, when excess fat harms the body's organs and tissues" (Guglielmi 2025 p773).

BMI is easy to measure and compare, but does not take account of body composition (eg: muscle vs fat). "For people of European descent, obesity is typically defined by a BMI of 30 or higher, which correlates with a high level of body fat. However, a muscular athlete might be labelled obese on the basis of BMI, whereas someone with a 'normal' BMI might have excess fat that increases their risk of heart problems or other serious health issues..." (Guglielmi 2025 p773).

The new approach would consider body fat above 25% in men and 30-38% in women to be risks. "Because measuring adiposity directly might be impractical or costly, alternative health markers such as waist size, waist-to-hip ratio or waist-to-height ratio are important..." (Guglielmi 2025 p774).

Busetto et al (2024) also challenged the use of BMI only.

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3. TYPE OF DIET AND WEIGHT LOSS

The type of food eaten while dieting can influence the success in weight loss. This was shown in the "Ultra-processed vs minimally processed diets following UK dietary guidance on health outcomes" (UPDATE) trial (Dicken et al 2025). It was a crossover study where all participants received both dietary regimens at some time. There was no restriction on how much was eaten.

The participants were 55 adults of varying weights in England (who were staff at University College London Hospital) who undertook two eight-week regimens - minimally processed food (MPF) and ultra-processed food (UPF) in random order. Greater weight loss was found for the MPF diet period (average weight loss 2.06% of baseline weight at Week 8 compared to 1.06% loss with the UPF diet).

The two diets were matched for dietary content. Furthermore, the researchers explained, "[T]he crossover design removed between-participant confounding, and the free-living, community-based setting provides real-world evidence directly applicable to the public. Participants were blind to the primary outcome and not told to change their weight or dietary intake. Providing all food and drink ready prepared without cost to participants' homes helped maximise adherence, ensure internal validity and minimise dropout. UPF was sourced from leading UK supermarkets and were not culinary preparations, providing a diet representative of UPF available in the UK. Participants' habitual dietary intakes were broadly similar to UK averages, aiding generalisability to the UK population" (Dicken et al 2025 p10).

Not all participants kept the food diary, which was the main measure of adherence (ie: self-report). "It was not possible to directly assess energy balance measures such as energy intake or mechanisms such as eating rate due to the free-living design. To minimise participant burden, nutrient biomarkers and stable isotope analyses were not used for diet assessment; however, there are currently no validated biomarkers of UPF intake. Detailed body composition analyses such as dual X-ray absorptiometry were also not conducted. Finally, there was no processed food diet, though the smaller number and range of processed foods limits the ability to create a healthy, balanced processed food diet" (Dickens et al 2025 p10).

In terms of similar previous research, Hall et al (2019) found a small weight loss with a MPF diet (average

0.9 kg), but a weight gain with an UPF diet (average 0.9 kg) over two weeks in an inpatient study, while Hamano et al (2024) found a weight gain on both diets over seven days (though the gain was significantly more with the UPF diet) (Dicken et al 2025).

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4. OBESITY AND HEALTH

Overweight and obesity is increasing around the globe, particularly in the USA, as measured by body mass index (BMI). "It is well-established that elevated BMI can contribute to several cardio-metabolic conditions, including diabetes, hypertension, and coronary artery disease, which are among the leading causes of premature death in the US" (Visaria and Setoguchi 2023 p2). Saying that, there is some inconsistency in the data.

Visaria and Setoguchi (2023) made some suggestions for the inconsistency, including that "most US studies to date have used data from the 1960s through the 1990s and have included predominantly non-Hispanic White men and women. In contrast, the contemporary US population: (1) has a substantially different BMI distribution, with mean BMI having risen by more than 2 kg/m^2 in both men and women since the 1970s, and increasing skewness towards obese-range BMIs; (2) has seen >10 year increases in life expectancy both overall and among obese individuals; (3) is more racially and ethnically diverse, with the percentage of non-Hispanic Whites decreasing from 84% in 1990 to 58% in 2020; and (4) has seen improvements in efficacy and access to treatment strategies for obesity-related conditions. All of these factors may alter the association between BMI and mortality" (p2).

The few studies with contemporary populations have their own methodological limitations, including small overall sample sizes, and racial and gender sub-samples, and confounders like "collider bias" ("eg: the concept that conditioning on obesity-related disease may distort associations between risk factors like BMI and diet and subsequently bias downstream associations"; p2), and the "healthy person effect" ("eg: selection bias that may be introduced when selecting participants of different BMI groups who may otherwise be healthy"; p2) (Visaria and Setoguchi 2023).

Visaria and Setoguchi (2023) sought to overcome the above mentioned limitations with nationally representative data from the 1999-2018 National Health Interview Survey (NHIS). Data from a sample of over 550 000 non-pregnant adults aged twenty years and above were analysed. BMI was calculated from self-reported weight and height, and all-cause mortality came from official records (US National Death Index). Analysis was based on nine BMI categories with 22.5 - 24.9 kg/m^2 being the comparison group.

There were over 75 000 deaths during the follow-up

(up to 20 years). An increased risk of mortality was seen for BMI ≥30. "Older adults showed no significant increase in mortality between BMI of 22.5 and 34.9, while in younger adults this lack of increase was limited to the BMI range of 22.5 to 27.4" (Visaria and Setoguchi 2023 p1).

The conclusion was that "BMI may not necessarily increase mortality independently of other risk factors in adults, especially older adults, with overweight BMIs" (Visaria and Setoguchi 2023 pp1-2). So, there may be advantages to a higher BMI compared to the "conventionally normal" range, including that "overweight individuals may have survival advantages in various adverse circumstances, such as critical illness, major morbidities, and severe infection that are not offset by the increased risk of chronic metabolic diseases" and "overweight individuals without disease may be metabolically healthy and have a more favourable body composition consisting of higher lean mass. Further, BMI alone may be insufficient in classifying high-risk adiposity – both waist circumference and weight change over time can modify BMI-mortality associations..." (Visaria and Setoguchi 2023 p11).

The measures in this study were self-reported (except death), and BMI at a single point in time was used.

In summary, there may an association between higher BMI and increased risk of mortality, but the relationship is more nuanced than a single linear one, according to this study.

Obesity is linked to increased risk of male infertility (eg: three-fold increase according to some studies, though this may be an underestimate) (Rasouli et al 2024). There are a number of physiological changes due to obesity which cause the infertility risk, including (Rasouli et al 2024):

i) Metabolic syndrome - This is "a cluster of metabolic factors related to insulin resistance, namely: increased abdominal obesity, elevated systolic blood pressure (SBP) and/or diastolic blood pressure (DBP), hypertriglyceridemia, hyperglycaemia and decreased serum high-density lipoprotein-cholesterol (HDL-C) levels; which together increase the risks of cardiovascular diseases and type 2 diabetes mellitus" (Rasouli et al 2024 p203). Consequences include impaired testicular function, and reduced sperm count, concentration, and motility.

ii) Hypothalamic pituitary unit function - eg: changes in hypothalamic gonadotropin-releasing hormone, which triggers other hormones involved in sperm production.

iii) Erectile dysfunction.

iv) Other physiological changes - eg: an increase in soft tissue around the scrotum raises scrotal temperature and impairs sperm production.

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5. BRAIN AGEING AND ANOREXIA NERVOSA

Neuroimaging studies have shown differences in the brains of individuals with anorexia nervosa (compared to healthy controls) (eg: reduced grey matter volume in adolescent sufferers; eg: Bahnsen et al 2022) (Stratton et al 2024). Note that establishing cause and effect is not straightforward.

But developmental changes in the brain are common. "Our brains undergo numerous structural changes during development and subsequent ageing. These neural changes are characterised by synaptic reorganisation and elimination, dendritic pruning, de-/myelination and cell body shrinkage. Specifically, grey matter volumes show a steady decrease from childhood onwards, while white matter volume follows an inverted 'U-shape', peaking in early adulthood" (Stratton et al 2024 p499).

One area of growing interest is "advanced brain age" - "an 'older' predicted brain age compared to chronological age" (Stratton et al 2024 p499). Stratton et al (2024) investigated this in relation to adolescent anorexia nervosa.

Magnetic resonance imaging (MRI) scans of female volunteers were analysed. The German sample included 129 acutely underweight DSM-IV-diagnosed anorexia nervosa patients, 39 recovered anorexia nervosa patients, and 167 healthy controls all aged between twelve and twenty-three years. A "BrainAGE" score was calculated using machine learning that compared the individual brain scan to model healthy brain ageing.

At baseline, the current anorexia nervosa patients showed a higher BrainAGE score (ie: mean 1.79 years older brain than chronological age) [1].

Ninety-five of the patients were followed up during partial weight recovery (around three months), and during this period the BrainAGE score improved (ie: brain age similar to chronological age). A "larger weight gain predicted larger normalisation of BrainAGE" (Stratton et al 2024 p502).

The study concluded that brain ageing in adolescents with anorexia nervosa was transient, and contradicted the view that changes were permanent (eg: Nilsson et al 2013). Whether there is a longer term impact of this temporary change is to be discovered, argued the researchers.

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[1] Studies of BrainAGE in patients with other mental disorders, include up to 4 years in major depressive disorder, 3-6 years in schizophrenia (eg: Constantinides et al 2022), and three years in bipolar disorder (ie: brain older than chronological age) (Stratton et al 2024).

In terms of the biological mechanisms of advanced brain ageing, for example, "inflammation and mitochondrial dysfunction, which are characteristic of natural ageing, might become dysfunctional in anorexia nervosa, especially during the acute stage of disease" (Stratton et al 2024 p503).

The researchers admitted that "the interpretation of BrainAGE is not straightforward. It is not a direct measure of chronological age, but rather an assessment of deviation from typical ageing trajectories observed in a healthy population. The observed 'rejuvenation' of brain age does not imply a reversal of chronological ageing. Instead, the observed decrease in BrainAGE score reflects a partial reversal of accelerated brain ageing – brain structures may be returning to a state more typical of a person of that chronological age, indicating a reversal of some (pseudo-)atrophy. Thus, the BrainAGE framework provides valuable insight beyond mere loss of brain matter. It quantitatively assesses recovery in brain health and structure, providing a useful biomarker for evaluating the effects of treatment and recovery in disorders such as anorexia nervosa. Nevertheless, effects should be considered with caution" (Stratton et al 2024 pp503-504).

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6. ORAL HEALTH-RELATED QUALITY OF LIFE

6.1. INTRODUCTION

Minamidate et al (2020) began: "Oral health is an important component of overall health, as oral disorders can have a significant impact on physical, social, and emotional well-being. For example, among oral disorders, dental caries (tooth decay), missing teeth, malocclusion [misaligned bite] and cranio-facial anomalies can adversely affect quality of life (QoL). Therefore, oral health-related quality of life (OHRQoL) is becoming increasingly important in both population research and clinical practice" (p1) [2].

It has been estimated that around 3.5 billion people worldwide experience oral diseases, most commonly dental carries, which "has adverse effects on individuals' quality of life and social functioning" (Shakiba et al 2022 p1). Carries are more prevalent in low-income groups in societies (Shakiba et al 2022).

6.2. CHILDREN AND ADOLESCENTS

OHRQoL can be measured by the "Child Oral Health Impact Profile-Short Form 19" (COHIP-SF19) (Broder et al 2007). The 19 items include, "had crooked teeth or spaces between teeth", "had difficulty keeping teeth clean", "avoided smiling or laughing with other children", "had difficulty saying certain words", and "been worried about what other people think about your teeth, mouth, or face". Simply, this measures orthodontic misalignment in children and impact on life.

One study found that higher scores were significantly associated with malocclusions in children

[2] "Current literature suggests that the presence of a malocclusion predominantly impacts on the emotional and social well-being domains of OHRQoL, and these, especially emotional well-being, are thought to be influenced by a multitude of factors including personality and self-esteem. As such factors can vary over time and be influenced by environmental factors, the impact of malocclusion on OHRQoL should ideally be assessed using longitudinal study designs that allow for the elimination of such confounding factors" (Javidi and Benson 2014 p58).

and adolescents in Germany (eg: overbite; overjet; competent lip closure) (Kunz et al 2019).

In such studies, the privacy of patients is important, and there are ways to achieve this, including pseudonymising the data, encrypting information, or limiting the replication of data (Wall 2020).

6.3. OLDER ADULTS

A review of six observational studies found no statistically significant difference in "Geriatric Oral Health Assessment Index" (GOHAI) (Atchison and Dolan 1990) scores (a measure of OHRQoL in older adults) [3] between patients with or without Alzheimer's disease (AD) (Ming et al 2020).

This is contrary to the general concern and other studies (eg: Hatipoglu et al 2011) that "[P]atients with AD (especially in the later stages of the disease) may present with poor oral hygiene, high levels of caries and periodontal disease, difficulty wearing dentures and inability to cope with dental care. It is plausible that the above may negatively affect the patient's quality of life" (Plessas and Paisi 2020 p124).

OHRQoL for adults with AD is affected negatively by factors like the number of teeth (less than five natural teeth), the number of carious teeth (more than two molar teeth), and poor condition of dentures (Plessas and Paisi 2020).

Plessas and Paisi (2020) criticised Ming et al's (2020) review for concentrating only on studies using the GOHAI, cross-sectional studies, and those with small samples.

6.4. SOCIO-ECONOMIC BACKGROUND

OHRQoL was poorer in adolescents from lower socio-economic backgrounds in a Brazilian study (Sfreddo et al 2019). Worse OHQoL was also associated with being female, having seen a dentist for toothache, and tooth problems. These variables have been found to contribute to OHRQoL in other studies (van Harten 2020).

Though OHRQoL is poorer in low socio-economic groups, another Brazilian study (Knorst et al 2019) found

[3] Twelve items including, "How often were you able to swallow comfortably?", "How often were you able to eat anything without feeling discomfort?", and "How often did you limit contact with other people because of the condition of your teeth or dentures?" (Venkatesan et al 2020).

differences depending on individual and neighbourhood social capital. Individual social capital included variables like parental involvement with school activities, as well as household income, while neighbourhood social capital was measured by the presence of community assets (eg: cultural community centres; workers associations).

Social capital generally can be defined as "networks together with shared norms, values and understandings that facilitate co-operation within or among groups" (Healy and Cote 2001 quoted in Moore 2019). Health can be improved by social capital in different ways. For example, close ties ("bonding" social capital) that mitigate life stressors, like family members supporting each other with dental appointments and issues. "Bridging" social capital involves the transfer of information (eg: the best dentist to visit), and "linking" social capital "refers to links between individuals and groups at different levels in the social or power hierarchy; opening up resources and opportunities to less powerful or excluded groups" (Moore 2019 p90).

One problem for researchers is "how to accurately measure such a complex social concept" as social capital (Moore 2019 p90).

6.5. SUGAR INTAKE

Sugar intake (particularly in sugar-sweetened beverages; SSBs) is related to level of carries, which has led some governments to impose an SSB tax. What has been the impact of such a tax on oral health-related outcomes? Shakiba et al (2022) reviewed the evidence.

Five relevant studies published before mid-2020 were found in a search of academic databases. All the studies were modelling the impact of the tax, and there was no empirical data collected. The studies "altogether anticipate a positive impact" (Shakiba et al 2022 p1). But a likely positive result of an SSB tax does depend on the industry response, and demographic and socio-economic characteristics of the consumers.

The reviewers admitted: "None of the five studies included were performed in a real-world setting and in order to assess the effects of an SSB tax, the studies used models in which the relationship between sugar consumption and caries increment were considered as linear. While this approach can facilitate the calculations, it cannot accurately reflect the actual

nature of dental caries with various patient-related and environmental-influencing factors" (Shakiba et al 2022 p4).

The studies in the review varied in their methodology in a number of ways:

i) The level and nature of the SSB tax.

ii) The outcome measure - eg: decayed, missing and filled teeth (DMFT) averted per year; carries reduction.

iii) The response of SSB producers to change their products, and the price-elasticity of consumers.

iv) The type of statistical modelling used.

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7. REGAINING WEIGHT

The vast majority of overweight and obese individuals who lose at least one-tenth of body weight with dieting regain that weight within one year post-diet (Wong 2024). The explanation may be linked to epigenetic and genetic changes in fat cells (Hinte et al 2024).

Put simply, the body responds to dieting in a way that sets a "memory" that continues after the diet stops. It is almost as if the "lack of food response" to the diet continues even when eating is back to normal, and so the weight lost previously is regained.

In more technical language, Hinte et al (2024) explained their findings of "epigenetic memory" - "by using single-nucleus RNA sequencing, we show that both human and mouse adipose tissues retain cellular transcriptional changes after appreciable weight loss. Furthermore, we find persistent obesity-induced alterations in the epigenome of mouse adipocytes that negatively affect their function and response to metabolic stimuli. Mice carrying this obesogenic memory show accelerated rebound weight gain..." (p457). This would explain the "yo-yo" effect of weight loss during dieting followed by weight gain when dieting stops.

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8. TREATMENTS FOR OBESITY

8.1. BARIATRIC SURGERY

Bariatric and metabolic surgery (BMS) for weight reduction can be effective, but long waiting times have led to self-funded bariatric surgery medical tourism (BMT). Zuberi et al (2024) found long waiting lists along with higher cost at home but lower cost abroad, strict criteria at home, and lack of services at home were key factors in BMT. The quality of care abroad, however, is an issue.

For example, Azlan et al (2023) surveyed bariatric clinics offering BMT, and found that "(1) 32.4% are internationally accredited, (2) 44% do not address BMS risks and benefits, (3) only 23.5% recommend liaising with the patient's primary care physician, and (4) less than a third of centres offer either psychological or dietetic assessment" (Dobbie et al 2025 p1712).

Dobbie et al (2025) added: "Bariatric centres often use targeted social media campaigns and incentivised packages and it is unclear how safety is prioritised at reduced costs" (p1712).

Dobbie et al (2025) surveyed 119 health care professionals in bariatrics and 88 patient representatives from 26 countries in Europe using the Delphi process method. This involves a number of rounds of questions and answers until a consensus is reached by the respondents. Key themes that emerged included regulatory standards (including surgeon accreditation), patient education (eg: risks of treatment), pre-operative assessment of psychological health and co-morbid physical health conditions, and post-surgery follow-up.

8.2. NEW DRUGS

The drug semaglutide (a GLP-1 agonist) (known by the brand names "Ozempic" [4] or "Wegovy") suppresses appetite

[4] The "superstar" nature of Ozempic was summed up by Steven Dayan (University of Illinois), who stated: "We're seeing so many incredible benefits. It's early days, but it's looking like these drugs aren't just going to change medicine but our whole economy" (quoted in Thomson 2024) (appendix 8A).

by mimicking the gut hormone glucagon-like peptide 1 (table 8.1) [5]. But muscle loss is a concern because "reducing calories leads to an energy deficit, which the body often makes up for by burning muscle" (table 8.2) (Dolgin 2025 p308). Bimagrumab (originally developed for age-related muscle loss) is being tried experimentally here (Dolgin 2025).

- Orforglipron is a daily oral GLP-1 receptor agonist, whereas other such drugs involve daily or weekly injections. Wharton et al (2023) reported a phase 2 trial that found weight loss benefits.
- In 2021-22 272 participants in Canada, the USA, and Hungary were enrolled with a BMI of ≥30 or a BMI of 27 to <30 with at least one weight-related problem. They received either one of four dose levels of the drug or a placebo for 36 weeks. The outcome measure was percentage change in body weight from baseline (start of the trial).
- There was a significant reduction in body weight in the drug groups compared to the placebo group at Week 36 (eg: -14.7% mean reduction in highest dose group (45 mg) vs -2.3% in placebo group). There was also "clinically meaningful change" in systolic (but not diastolic) blood pressure, and in cholesterol.
- Nausea was the most common side effect reported by between one-third to over half of participants. "Adverse events reported for orforglipron were similar to those with injectable GLP-1 receptor agonists" (Wharton et al 2023 p877).

Table 8.1 - Orforglipron.

This is one of more than 100 anti-obesity drug candidates at various stages of development into an approved medicine (Dolgin 2025).

"Although drugs such as semaglutide and tirzepatide have been shown to reduce the risk of stroke, heart attack and other cardiovascular problems, as well as alleviate sleep apnoea and improve liver function, they have also been tied to conditions such as arthritis and pancreatitis. The unknown risks, particularly in diverse populations and with prolonged use, lead some clinicians to favour established surgical solutions, such as bariatric surgery. But uncertainty hasn't dissuaded pharmaceutical companies from pursuing an expanding array

[5] The main rival is tirzepatide (brand names "Zepbound" or "Mounjaro"), which mimics GLP-1, and gastric inhibiting polypeptide (GIP) (Dolgin 2025).

of hormone targets" (Dolgin 2025 p309).

As well as gut hormones, drugs based on other mechanisms are being tried or repurposed, including based on a mutation in a gene called INHBE associated with low waist-to-hip ratio, cannabinoid receptor CB1, food absorption in the intestines, and enzymes that metabolise fat (Dolgin 2025).

- Estimates vary, but the amount of weight loss due to muscle loss is about one-quarter to one-third (Prado et al 2024). "This substantial muscle loss can be largely attributed to the magnitude of weight loss, rather than by an independent effect of GLP-1 receptor agonists, although this hypothesis must be tested" (Prado et al 2024 p785).

- There is the possibility that "despite the reduction in total muscle mass, muscle composition might improve, thereby enhancing muscle quality. If this is the case, it can improve body composition, which might maintain or even enhance muscle functions, such as strength. Muscle composition includes myosteatosis (ie: fat infiltration into muscle), which is linked to adverse health outcomes, and muscle quality refers to the ratio of muscle strength to muscle mass" (Prado et al 2024 p785).

- Muscle does more than provide strength (ie: as a functional organ), it is a metabolic organ. That is "muscle acts as a reservoir for amino acids, including those involved in responding to stress, trauma, and infection. Muscle tissue also synthesises and stores glutamine, a key amino acid involved in nitrogen transport and immune function. Furthermore, muscle mass greatly influences glucose homoeostasis by taking up glucose in response to insulin, thus maintaining normoglycaemia. Muscle-derived myokines — signalling molecules produced and released by muscle cells — serve as endocrine factors that modulate systemic metabolism, energy balance, and inflammation" (Prado et al 2024 p785).

- Prado et al's (2024) conclusion was that GLP-1 receptor agonists are beneficial for weight loss ("revolutionised obesity treatment"; p786), but the potential for muscle loss needs to be monitored and studied.

Table 8.2 - Muscle loss.

"Retatrutide" works on GIP, GLP-1, and glucagon receptors, and early trials have suggested benefits in weight loss. In a phase 1b trial over twelve weeks with adults with type 2 diabetes, an average weight reduction of 9 kg was reported (Urva et al 2022), while in a phase 2 trial weight loss up to 24% of baseline was found (Jastreboff et al 2023).

Jastreboff et al (2023) recruited 338 adults in the USA with a BMI of 30 or above (obese), or a BMI of 27 to 29.9 (overweight) and at least one weight-related health condition. Individuals with diabetes were excluded. Participants were randomised to receive subcutaneous weekly doses of the drug for 48 weeks at six different doses or a placebo. The higher the dose, the greater the weight reduction (measured at 24 and 48 weeks). Greater weight reduction was also associated with a BMI of 35 or above, particularly for women.

"The most common adverse events in the retatrutide groups were gastrointestinal; these events were dose-related, were mostly mild to moderate in severity, and were partially mitigated with a lower starting dose... Dose-dependent increases in heart rate peaked at 24 weeks and declined thereafter" (Jastreboff et al 2023 p514).

8.3. APPENDIX 8A - MARVELLOUS GLP-1 DRUGS

The "cure-all" promise of Ozempic (and similar drugs) include the reduced risk of heart attack and stroke, positive reports about depression and anxiety, benefits for reducing cognitive decline, and "Ozempic pregnancies" (improved fertility) (Thomson 2024). "Why this drug is helping so many conditions is still mysterious, but researchers are beginning to unravel the mechanisms underlying its extraordinary abilities" (Thomson 2024 p35).

Randy Seeley from the University of Michigan at Ann Arbor admitted: "We are in the 'maybe it will cure everything' stage with this drug. Some of these ideas are going to fall by the wayside when we do good trials, some will work out, but there's a lot of work to be done before we understand what these drugs are truly capable of" (quoted in Thomson 2024).

Examples of Research:

1. Cognitive decline - A twelve-month trial of liraglutide with mild to moderate Alzheimer's patients in the UK found benefits in terms of reducing the decline in volume of certain areas of the brain, and in performance on cognitive tests compared to controls (Edison et al 2021).

2. Depression - Chen et al (2024) reviewed the evidence on the anti-depressant effects of GLP-1 receptor agonists, and found five relevant randomised controlled

trials and one prospective cohort study. Overall, depression scores significantly declined with the drug compared to placebo. Despite this finding, Chen et al (2024) warned that "the exact mechanism underlying this effect remains unclear" (p124).

As with any synthesis of research, there were differences in the methodology of studies, including in length (24-60 weeks), the depression rating scale, and the GLP-1 drug and dosage.

3. Behaviours - Semaglutide administered daily or weekly to healthy mice led to changes in behaviour in different tests, including an increase in anxiety, reduced motivation [6] (eg: male interest in sniffing female urine), and less depression-like behaviours (in the forced swimming test). The behaviour changes were seen in the daily dose group only, and overall many behaviours did not change compared to controls. The applicability of the findings to human patients can be questioned, as well as "the lack of a weight-matched control group (eg: mice on a calorie-restricted diet), which would help determine whether the observed behavioural changes are directly due to semaglutide's central effects or simply a consequence of weight loss" (Moreno et al 2024 p3).

4. Inflammation - Semaglutide as reducing inflammation has been reported, but the "exact mechanisms of its anti-inflammatory effects are not fully understood" (Yaribeygi et al 2024 p1). The suggestions are via two major pathways: reducing inflammatory cytokine levels, and modifying immune system activity. There are experimental studies with mice, and clinical trials with humans with type 2 diabetes (Yaribeygi et al 2024).

Pain relief has also been reported (eg: Go et al 2024). Endurance of pain can be measured by how quickly a mouse retract their paw from a heated surface. Animals treated with GLP-1 drugs kept the paw on the surface for approximately 25% longer than controls (Wade 2024b).

5. SELECT (Semaglutide Effects on Cardiovascular Outcomes in People with Overweight or Obesity) Trial (at over 800 sites in 41 countries) - The SELECT trial with over 1700 overweight and obese adults randomised to

[6] The motivation to exercise was tested with an exercise wheel for a mouse that would periodically lock up while the animal was using it. To unlock it, the mouse had to press a lever with its nose, and each stop required more pressing to unlock the wheel. Eventually, a mouse would give up (called "their break point"; Ralph DiLeone). Mice on semaglutide pressed the lever one quarter less than the control group (Wade 2024a).

semaglutide or placebo has found benefits in terms of reduced major adverse cardiovascular events (Lincoff et al 2023), and negative kidney outcomes (eg: death from kidney disease) (Colhoun et al 2024).

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9. NUTRITION AND CALORIE LABELLING

The introduction of nutrition labelling (eg: calorie content) of out-of-home food (eg: at restaurants [7]) is designed to deal with rising obesity and overweight [8]. Polden et al (2025), however, found no decrease in self-reported calories purchased or consumed from the out-of-home food sector (OHFS) by over 6500 customers in England after mandatory calorie labelling, but there was an increasing awareness of calories in the food. Sampling took place in four areas of the country in late 2021 (before labelling) and in late 2022 (post implementation). Customers were surveyed on exiting the outlet [9].

Controlled studies are rare, but Vasiljevic et al (2018) reported a pilot study involving six English worksite cafeterias which varied the environment via calorie labelling for 116 days in late 2016. Calorie content was displayed in the same font style and size as the price of the item. The main outcome measure was total energy (calories) purchased.

Overall, there was no reduction in calories purchased compared to pre-intervention, but one site showed a 6.6% reduction in energy purchased on the day after the introduction of labelling (though this diminished over time).

There were a number of methodological limitations with the pilot study, including that cafeterias did not label all products through lack of information. In the worst case, only half the products were labelled. "Catering managers of the six sites identified chef's discretion at implementing meal recipes as an additional barrier to intervention implementation" (Vasiljevic et al 2018 p11).

The cafeterias provided data on purchases in different ways, some distinguished between food and drink purchases, others did not, and the researchers had to calculate median energy content. Some foodstuffs (eg: fruits; confectionery), furthermore, were free to employees.

"Calorie labels were designed to be prominent to the

[7] The English government defined "out-of-home food outlets" as "generally considered to be any outlet where food or drink is prepared in a way that means that it is ready for immediate consumption, on or off the premises" (quoted in Trompeter et al 2025).

[8] Calorie labelling has been introduced in parts of Australia and Canada, and nationally in the USA and England, for example (Finlay et al 2024).

[9] One systematic review of calorie labelling generally (Crockett et al 2018) calculated an average reduction of 47 calories in food purchased (Polden et al 2025).

customer at the point of choice, and were presented in the same font style and size as the product price. These features may have also inadvertently decreased the impact of the intervention by making the calorie information less distinguishable from all the other information on the product label, thus dampening the potential impact of calorie labelling" (Vasiljevic et al 2018 p11).

As with any policy there are unforeseen consequences [10]. "In particular, concerns have been raised that nutrition labels focused on calorie content exacerbate eating disorder cognitions and behaviours that centre around reducing calorie intake, promote pre-occupation with calories and increase anxiety when eating out among people with eating disorders" (Trompeter et al 2025 pp1-2).

Trompeter et al (2025) reviewed the evidence on out-of-home food nutrition labelling and individuals with eating disorders (or high risk of them) [11]. Sixteen relevant studies published before October 2023 were found. Six of the studies used qualitative or mixed methods, and the remainder were quantitative methods-based studies.

Overall, "eating disorder pathology was associated with noticing labels more frequently, paying more attention to caloric intake and more frequent behaviour changes due to caloric values" (Trompeter et al 2025 p1).

Five meta-themes emerged from the qualitative studies, which supported these findings, but also showed more nuance to the experiences:

i) "Being drawn to calories" - Individuals already "highly attuned to calorie control" became "hyperaware of calories" (p8) with labelling.

ii) "Facilitating the eating disorder - The perception that the labelling was "reinforcing eating disorder beliefs" (p8).

iii) "Reassurance" - "Some participants reported

[10] "The idea is that having more information means that people will make better decisions. But there may be so many other, potentially stronger, effects that are going to affect their decisions. People may think about, say, value for money rather than lower calories" (Mike Essman quoted in Robson 2024). Calorie labelling depends on an individual's awareness of the appropriate daily calorie needs, but US research (Krukowski et al 2006) found that less than three-quarters of those questioned could accurately state their daily calorie needs (Polden et al 2025). Calorie labelling is an example of "choice-architecture" (or "nudging" in more popular terminology), where individuals are encouraged to make "good" choices by factors in the environment.

[11] Note that labelling and obesity has been studied (eg: Long et al 2015).

that the presence of calories on menus left them feeling safer, enabling a freedom to engage socially with others and begin to take perceived 'risks' around food choices" (Trompeter et al 2025 p8).

iv) "Social eating" - "Participants felt that nutrition labelling served to spoil the enjoyment of eating out with others. Nutrition labelling was noted to facilitate diet talk among their companions, and some individuals feared that requesting calorie free menus might lead to their eating disorder being exposed. For some participants, they avoided eating out altogether resulting in a sense of isolation" (Trompeter et al 2025 p9).

v) "Frustration" - For example, calorie labelling introduced as mandatory in England in 2022 was described as causing frustration for individuals with eating disorders because "this had been forced on them due to their perceptions that it was both ineffective and lacked consideration for those with eating disorders" (Trompeter et al 2025 p9).

There was heterogeneity in the findings in, for example, the difference in the impact of labelling for individuals with binge eating issues and those with restrictive eating concerns (Trompeter et al 2025).

Trompeter et al (2025) noted some weaknesses with the studies in their review, including:

a) A limited consideration of the cultural and societal context of labelling and its impact.

b) The use of convenience samples, like undergraduates, while children and adolescents were not studied.

c) Different types of labelling (eg: "traffic-light system"; equivalent exercise values; numeric calorie content) and their impacts.

d) Individuals with different eating disorders or potential eating disorders.

e) Consideration of confounders like individual's prior knowledge of nutrition, socio-economic status, and education level.

Calorie label accuracy is another issue. Finlay et al (2024) sampled 295 menu items from different categories (eg: starters; main course) at a selection of outlets (eg: cafe; restaurant) in two areas of England. Mean measured calories by the researchers using bomb calorimetry were significantly lower than reported by the outlets. However, there were also underestimates in reported calories. The average overall discrepancy was 21%.

"The errors included both under and overestimations, which may have come about due to variations in portion size or the methods used to calculate the content. There is no reason to believe that outlets are deliberately misleading consumers, but this uncertainty may reduce the public's trust in the policy" (Amy Finlay in Robson 2024).

In England, for instance, the official guidelines recommend that "businesses can calculate the energy content of menu items by averaging values based on manufacturers analysis, known or average values of ingredients used, or established and accepted food databases. The energy content of menu items must be displayed alongside the portion size to which it relates, and a statement that 'adults need around 2000 kcal a day' at any point of choice for the consumer. A 20% discretion between the reported and calculated energy content is permitted, but guidance acknowledges that accurate testing of energy content may not be viable for local enforcement officers" (Finlay et al 2024 p3). It has been estimated that around four-fifths of businesses in the USA comply with mandatory calorie labelling (Finlay et al 2024).

In comparison studies between testing and labels of packaged foods inaccuracies have been found (eg: under-reported in a study of over 1000 items from supermarkets, bakeries and restaurants in Canada; Fitzpatrick et al 2014).

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