

## Lifestyle, Obesity and COVID-19

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### **ABSTRACT**

People with obesity are at increased risk of contracting COVID-19 and of having an adverse outcome following infection. This increased morbidity and mortality has re-focused attention on the need to tackle the obesity epidemic. This overview explores current weight loss strategies and proposes how these could be improved at an individual level to ensure that success can be maintained in the longer term.

Following a COVID pandemic interruption to our own weight loss programme, we conducted a wide-ranging literature review. This investigated current levels of success on weight loss and weight loss maintenance programmes, including a focus on remediable lifestyle factors, with a view to designing an optimal weight loss programme.

Short term success in weight loss programmes is common, but longer-term success is rare. Lasting dietary and lifestyle changes are required in the context of a long term, supportive approach. Essential elements include early rapid weight loss, active monitoring and support, nutritional education, on-going physical activity plus psychological counselling when required.

Legislative and societal changes invoked by national governments will have only a slow impact on the obesity epidemic, too slow to influence current Covid induced morbidity and mortality among overweight populations. Well designed and supportive programmes at an individual level are required to tackle the syndemic of obesity and Covid-19.

### **KEYWORDS**

Obesity; Weight loss; Lifestyle; Diet; COVID-19

### **INTRODUCTION**

The Lancet editor, Richard Horton [1], has recently published a hard-hitting book “The COVID-19 Catastrophe: What’s gone wrong and how to stop it happening again”. In his prescription for change, he outlines important international issues for politics, for society and

for medicine. He does not, however, make any recommendations as to where lifestyle changes or reducing community levels of obesity might fit into protective measures against future pandemics, including resurgences of COVID-19. We feel this is an important omission. In this paper we shall focus on the necessity to tackle obesity, the other modern epidemic, through weight loss and lifestyle

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measures, as one important element in the battle against COVID-19.

### ***Obesity and COVID-19***

There is now extensive evidence that people with obesity are more likely to contract COVID-19 infections, and to have a greater risk of adverse outcomes when they do [2-6]. Mortality rates are roughly doubled, compared with healthy weight patients [5] and quadrupled amongst the morbidly obese [6]. Indeed, obesity and poor nutrition have been highlighted as the main factors explaining the disparities in death rates across ethnic groups and by differing levels of social deprivation [4]. Ironically, pandemic-induced lockdowns appear to have triggered weight gain for many [7] through increased consumption of [sometimes less healthy] food. This has been coupled with an increase in alcohol sales, along with an escalation of sedentary behaviour - a situation christened “Covibesity” [8].

The link between obesity and adverse outcomes is thought to relate in part to the co-morbidities associated with obesity, notably diabetes, hypertension and cardiovascular disease [9-12]. Compromised lung function, through the mechanical effects of obesity on respiration, is also thought to cause further detriment [3,13].

Obesity is associated with impaired immune response to infections [14-16], a complex relationship which is beyond the bounds of this paper to elaborate in detail. Briefly, the pathophysiological mechanisms proposed to explain this include the chronic pro-inflammatory milieu of adipose tissue, and the increased production of cytokines as part of the intrinsic metabolic activity of visceral fat. In a nutritional context, it is worth noting that Vitamin D deficiency is linked with obesity, probably as a consequence rather than as a cause [17], and that low vitamin D levels may also be associated with poorer COVID-19 infection outcomes [18]. A correlation has recently been established

between vitamin D levels and COVID induced death rates across twenty European countries [19].

In the light of these associations between obesity and COVID-19, it is to be hoped that a powerful spotlight has been shone on the need for successful weight loss programmes. But such programmes may be rare.

### ***Problems with Weight Loss Programmes***

If overweight people follow any form of calorie restricting diet over any significant period, they will almost certainly lose weight. Many weight loss programmes, however, have a short-term focus of weeks or a few months, and report their “success” in terms of short-term weight loss [20]. Furthermore, most programmes give little attention to life style factors such as exercise and sleep, to education about healthy nutrition or to psychological factors that may be contributing to overeating.

Not surprisingly, weight loss for many participants in diet programmes is short lived [21], with less than 20% of people maintaining significant weight loss over a 2-years period [22]. Even the relatively short-term outcomes of many programmes are somewhat disappointing. Madigan et al. [23] investigated four programmes and found weight watchers to be the most successful at 3 months with an average weight loss of 4.2 kg. Outcomes are further deleteriously affected by high attrition rates [24]. One commercial weight loss programme reported only a 42% retention rate at 3 months [25] and drop-out rates from remotely delivered programmes can be even higher [26]. Furthermore, “outcomes” are often defined with reference to those participants who continue to engage throughout the study period [23], thus almost certainly flattering the efficacy of the intervention.

In the light of these defects in existing strategies, we designed our own Temple Vie Weight Loss and Lifestyle Change Programme. This commenced in 2019 but was

interrupted by the COVID-19 pandemic. At this point, we audited the outcomes of the patients who had completed the first twelve weeks of the programme, and this has been published elsewhere [27]. In brief, 36 subjects lost over 13kg on average, and there were reductions in blood pressure and serum lipids. Patient reported outcome measures showed marked improvements.

Our programme included a range of lifestyle aspects, but when COVID-19 effectively closed the programme, any such changes among our patients were embryonic and could not be evaluated. The lockdown did, however, give us the opportunity to reflect and to refine our views on what the “ideal” weight loss and lifestyle programme might comprise, both in the context of the pandemic and for the more distant future.

### ***Combatting COVID 19 with Weight Loss and Lifestyle Changes***

At an early stage of the COVID-19 pandemic, attention was drawn to some of the factors that might assist in “prehabilitating” against future waves and other infectious diseases [28]. More recently, such steps have been further discussed [29], notably with reference to enhancing the immune system through lifestyle practices [30]. We shall focus more narrowly on optimising approaches to weight loss, and on appropriate associated lifestyle changes. This approach seems readily implementable but has not been widely advocated as a protective measure during the pandemic.

#### ***(A) Early weight loss***

It was once thought that “slow and steady” was the best way to approach the goal of enduring weight loss. There is now considerable evidence to indicate that this was a mistaken belief. Indeed, rapid early weight loss is important for two reasons. Initial weight loss has been found to be a potent predictor of successful long-term success [31,32] and one study found it to be the ONLY factor associated with

enduring weight loss a year later [33]. Early weight loss success is also associated with better programme retention rates [34,35], presumably through a process of positive reinforcement of participants’ efforts.

It seems likely that it may not matter how rapid weight loss is achieved as long as it is achieved. For example, the Waianae Diet Programme in Hawaii [36], moved participants quickly on to what closely resembled a Mediterranean style diet, weight loss was rapid, and an excellent outcome was maintained over more than seven years. At the less “natural” end of the spectrum, a large and well-designed study of a total meal replacement diet with formula food products during the first 12 weeks also gave rise to substantial weight loss [37]. At one-year follow-up, this demonstrated much greater effectiveness than advising “healthy eating” dietary changes.

#### ***(B) Body contouring***

We recognize that recommending body contouring as a component of an ideal weight loss programme may be contentious.

There are many different non-invasive body contouring treatments available across the world, and these include cryolipolysis, LPG endermologie, radiofrequency, ultrasound and laser therapy. Beneficial effects have been found on fat reduction, skin tightening, and [to a lesser degree] for cellulite reduction [38-47]. In terms of actual measurements of changes in body shape (for example waist or thigh circumference) the effects are generally statistically significant but clinically modest, while ratings of patient satisfaction are generally positive [46,47].

From a health perspective, body contouring treatments may not be seen as a necessary component of weight reduction programmes. However, the importance of patient satisfaction cannot be ignored. Many people will persevere with a programme not solely for perceived [and sometimes

nebulous or far off] health benefits, but because they look more attractive with redistributed adipose tissue and tightened skin. This should improve the high attrition rates mentioned above.

Furthermore, the opportunity for therapists to counsel, explore and encourage during these regular sessions can be of pivotal importance. Regular supportive contact with patients embarking on weight loss has been found to be of significant benefit in reducing dropout rates [35,48]. The therapists, through these sessions, can contribute to the active monitoring as mentioned below.

### ***(C) Active monitoring***

Clearly it is preferable for patients undergoing rapid weight loss to be medically supervised. This is important from both health and nutritional perspectives.

Body composition analysis by bio-electrical impedance [49] is preferable to simple measurement of weight or body mass index [BMI], since these are poor estimates of actual obesity; it is percentage body fat and not BMI per se that correlates with health parameters [50,51]. Bio-electrical impedance data also includes visceral fat, a measure of the health consequences of obesity that is often targeted by patients, and skeletal muscle mass, an important measurement to monitor that patient are building muscle and not losing weight because they are breaking it down.

Another element of active monitoring comprises patient reported outcome measures (PROMS) [52]. These are completed regularly and cover (in our Temple Vie programme) the areas of body satisfaction, body image, physical function, psychological function and social function. In our view, PROMs are generally underutilised, since they provide not only very useful measures of patient-rated outcomes, but also act as a monitor of progress and satisfaction for both patients and health professionals.

### ***(D) Nutritional considerations***

Knowledge about nutrition among the general population is lacking. Women are slightly more knowledgeable than men, there is a socio-demographic gradient and a general ignorance about diet-disease links [53]. Knowledge of nutrition is associated with better adherence to a Mediterranean-style diet and to a lower prevalence of obesity [54]. In weight loss programmes, participants with better knowledge manage greater weight loss [55] and education assists with weight loss maintenance [56]. We would thus regard enhancing knowledge about nutrition to be an essential building block in a good weight loss strategy.

Although it had not been a universal finding [57], there is evidence that whole food plant-based diets are more effective than other dietary approaches in terms of both weight loss and weight loss maintenance [58-62]. Mediterranean diets are also effective [57,63]. Especially given the other health benefits associated with Mediterranean, vegetarian and vegan diets [62,64], it does seem that weight loss programmes should aim for participants to acquire lasting dietary habits along a Mediterranean to vegan spectrum according to their personal preferences. In terms of macronutrients for weight loss maintenance diets relatively high in protein and low in carbohydrates are often advised [65-68].

However, the Hawaii diet [36,69], which is high in complex carbohydrates, demonstrated strikingly good weight loss maintenance. As Greger [62] has described, an important element in weight loss maintenance is consumption of high quantities of fibre which “walls off” calories and promotes satiety with low calorie density foodstuff. He also draws attention to possible health risk from longer term low carbohydrate diets.

While the nature of the relationship is not clear, there is a known association between obesity and low circulating vitamin D levels [70]. Especially in this era of COVID-19,

consideration should be given to ensuring that participants in weight loss programmes receive Vitamin D supplementation when required since this could protect against infection and mortality [71,72].

#### ***(E) Physical activity***

During periods of rapid weight loss, vigorous exercise risks burning muscle, and thus increasing physical activity is more logically left until the later stages of a programme. Overweight enthusiastic exercisers should be reminded that physical activity alone is unlikely to lead to significant weight loss [73], but it becomes of very significant importance with regard to weight loss maintenance [74,75]. Indeed, the acquisition of a regular pattern of physical activity is a highly significant predictor of longer-term weight loss success [76]. When people find enjoyable physical pursuits, these are more likely to endure, and it may well be reassuring for patients to hear that huge energy expenditure is not required in the context of successful weight loss maintenance [77,78] when a sensible diet is pursued. Ideally, activities should comprise both aerobic and resistance exercise [79], and motivation to persist can be assisted with reminders about the many and varied health benefits of physical activity [80].

#### ***(F) Psychology/Counselling***

Associated psychopathology and disordered eating, not surprisingly, are common among people who embark upon weight loss programmes. The most common issues are binge eating [81] and emotional eating [82]. Although the majority of standard diet programmes do not address psychological or emotional issues, doing so is linked to successful weight loss outcomes [83-85].

For most people seeking to lose weight, however, high powered psychological interventions are not required. Motivational interviewing is helpful [86] as are behavioural interventions, across a range going from a common-sense analysis of the behaviours that precipitate and maintain

dysfunctional eating through to specialist therapy [87,88]. Many less complex behavioural and psychological issues can be addressed in the context of regular supportive sessions from non-medical therapists.

#### ***(G) Longer term considerations***

There is growing acceptance that successful weight loss needs to be viewed as a long-term venture, that lifestyle changes are required for healthy weight loss maintenance [89,90], and that long term support from a multi-disciplinary team is optimal [21]. It takes time for psychological issues to resolve and for good habits to develop. Long term success is associated with improved dietary restraint [89,91], active self-monitoring [90,92,93], and with development of good habits for buying and storing food [94]. Along with continuing to eat a nutritionally balanced but lower calorie diet, it is difficult to overstate the importance of regular physical activity in successful weight loss maintenance [74-76,95,96]. Once people have succeeded in maintaining a weight loss for two years or more, the outlook for continuing with a healthy weight in the longer term is significantly more positive [22,97].

### **CONCLUSION**

Across the developed world, the COVID pandemic has focused national attention on the lack of progress in tackling the obesity epidemic and the risks it poses to health across our nations. Recommendations, which are not new, have included improving community access to, and affordability of, healthy food, while imposing significant taxes and restrictions on obesogenic substances. As has been the case over the years that obesity levels have steadily increased, the introduction of such policies has taken place at a very slow pace. Partly through reluctance to challenge the huge, vested interests inherent in the food and beverage industries, such changes at a societal level will not be rapid. In the context of Covid-19, they will be ineffectual. It is necessary, therefore, to focus on individual approaches to weight

reduction, as discussed above. Governmental support for such programmes, filtering down through health based and other community institutions to overweight individuals, would constitute a meaningful step in the right direction.

### **COMPETING INTERESTS**

SJR and JME designed the Temple Vie Weight Loss and Lifestyle Change Programme as mentioned in the paper, and both work in providing that programme.

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