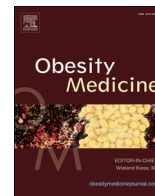




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Short communication

The Temple Vie weight management and lifestyle programme: initial data and reflections on Covid-19

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ABSTRACT

During the first three months of the Temple Vie programme, average weight loss in 36 subjects exceeded 13 kg. There were associated improvements in Patient Reported Outcome Measures, blood pressure and serum lipids. The Covid-19 pandemic may focus attention on programmes that give rise to rapid weight loss and improvements in cardiovascular health parameters.

1. Introduction

The scale of the obesity epidemic in westernised societies has led to a consensus that this must be tackled and reversed (Ravussin and Ryan, 2017). More recently, the Covid-19 pandemic has highlighted the increased risk of death when obese patients are infected (Dietz and Santos-Burgoa, 2020). Given the likelihood of subsequent waves of Covid-19 infections (Silver, 2020; Xu and Li, 2020), obese individuals may wish to slim down in the near future, so programmes that engender relatively rapid weight loss may well be favoured.

Our medically supervised Temple Vie weight management and lifestyle programme commenced in early 2019. In the light of generally poor long term outcomes following successful weight loss (Marchesini et al., 2016), Temple Vie was designed as an eclectic 2 year programme focussing on weight loss, body contouring, nutritional education, exercise promotion and psychological support. A detailed first assessment included physical examination, a dietary/nutritional history, and an account of current exercise activities. Patients were screened for depression, anxiety and for disordered emotional eating patterns, including an assessment of possible binge eating using the Binge Eating Scale (BES) (Gormally et al., 1982). Nutritional education, review of exercise activity and psychological support were provided at monthly medical appointments and by therapists during weekly body contouring sessions. When required, specialist psychological counselling was provided. The programme has been interrupted by the Covid-19 pandemic, and we report here on data from the first fourteen months.

2. Methods

Patients were enrolled in the Temple Vie programme from January 2019 onwards. All patients who completed their first medical assessment were considered as potential subjects for this audit. Data collection ceased at the 3 month point of the programme.

Following first assessments, patients commenced a high protein, low carbohydrate diet augmented by LPG body contouring (Ersek et al., 1997). In addition to physical examinations and blood tests, body composition was analysed using InBody 720 (Hlubik et al., 2013). This detailed weight, body mass index (BMI) and percentage body fat (PBF). Five patient reported outcome measures (PROMs), which derive from the Body-Q (Klassen et al., 2016) were deployed. Data were collected at 4 weekly intervals as summarised below:

Baseline: InBody, blood pressure, fasting bloods, PROMs, Binge Eating Scale (BES).

4 weeks: InBody, blood pressure, PROMs.

8 weeks: InBody, blood pressure, fasting bloods.

12 weeks: InBody, blood pressure, PROMs.

3. Results

Sixty patients completed Temple Vie first assessments. Of these 60, 12 did not have a second assessment at 4 weeks (8 dropped out, 4 had programmes interrupted by Covid pandemic). The remaining 48 form our overall cohort. Of these 48, 39 completed an 8 week assessment (3 dropped out/moved away, 6 interrupted by Covid), and 36 completed

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Table 1
Assessments at baseline, 4,8 and 12 weeks [means and (S.Ds)].

Timeline	Subject numbers	Weight (kg)	Body Mass Index	Percentage body fat	Body satisfaction PROM	Body Image PROM	Physical function PROM	Psychological function PROM	Social function PROM
baseline	48	94.2 (21.0)	34.1 (7.1)	43.8 (6.9)	15.0 (5.7)	10.5 (3.9)	24.0 (4.9)	27.7 (8.0)	28.9 (6.7)
4 weeks	48	88.1 (20.4)	31.7 (6.8)	41.6 (7.8)	19.7 (6.7)	13.6 (5.3)	25.1 (3.8)	29.2 (6.3)	28.2 (6.7)
8 weeks	39	82.6 (17.0)	30.1 (6.1)	39.2 (8.1)					
12 weeks	36	80.9 (16.9)	29.4 (6.0)	36.3 (9.6)	26.8 (6.8)	18.4 (6.2)	25.8 (3.3)	30.1 (6.0)	29.6 (6.6)

the 12 week assessments (3 dropped out/moved away). Only four of the cohort of 48 were men. Since their overall weight loss was essentially identical to the 44 women, we did not separate the sample by gender. The table shows data for weight loss, BMI, PBF and the 5 PROMs (Table 1).

The average weight loss of 13.3 kg (29 pounds) over 12 weeks is noteworthy. BMI fell by an average of 4.7 points and PBF by 7.5%. Of the PROMs, body satisfaction and body image showed the greatest change, with smaller improvements in physical and psychological function. Social function dipped during the first month presumably due to the social constraints of a strict diet, while improving slightly thereafter.

At baseline, 18 (38%) of patients scored 18 or more on the BES, suggesting a problem with binge eating.

Improvements were observed in health parameters. Mean blood pressure went from 126/81 to 119/76 at 12 weeks. Total cholesterol levels (upper limit of normal 5 mmol/l) went from a baseline of 5.39 at baseline to 4.64 at 8 weeks, whilst LDL cholesterol (upper limit of normal 3.0 mmol/l) went from a mean of 3.08 to 2.73 at 8 weeks. There was a modest reduction in fasting glucose levels from 4.97 to 4.61 mmol/l.

4. Discussion

These preliminary data from this small cohort who entered the Temple Vie weight management and lifestyle programme show distinct promise. The later stages of the programme, once weight is lost, focus progressively on exercise, education and psychological support – so these data within three months largely reflect the effects of the diet programme and weekly body contouring sessions. Patients are not encouraged to exercise vigorously during the first stages of the programme, but some (following significant early weight loss) may have increased their physical activity levels. Psychological screening at the outset of the programme identifies those with a dysfunctional relationship with food and our prevalence of binge eating is similar to other cohorts entering weight management programmes (Bertoli et al., 2015; de Zwaan, 2001). Counselling is offered but tends to be deferred until the relatively strict dietary restrictions are relaxed as patients progress through the stages of Temple Vie. That said, the weekly support from the therapists conducting the body contouring is of undoubted psychological importance. Education is an ongoing process from the start of the programme, with access to webinars and blogs as well as through the monthly medical reviews. Again, there is greater emphasis on nutritional and exercise education once initial weight loss has been achieved.

The rate of weight loss was encouraging. A study investigating commercial diet programmes in the UK found that the most successful of these (Weight Watchers) achieved an average weight loss of 4.2 kg in the first three months (Madigan et al., 2014), less than one third of that achieved on our programme. More rapid weight loss early in obesity management programmes has been found to be associated with improved weight loss maintenance (Astrup and Rossner, 2001). We anticipate that the improvements in patient reported outcome measures (PROMs) also augur well for the longer term success of our programme.

Reductions in PBF, blood lipids and blood pressure were also

notable. The association between obesity and cardiovascular morbidity, and the improvements following weight loss are well established. (Lavie et al., 2009). This association has been highlighted recently by the poorer outcome following Covid-19 infection amongst patients with obesity, hypertension and cardiovascular disease (Jordan et al., 2020; Wu et al., 2020). It is to be hoped that the Covid-19 pandemic, and the strong possibility of future waves of infection with this virus, will provide added impetus at a societal and individual level to address obesity and its health consequences.

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CRedit authorship contribution statement

Samantha J. Robson: Conceptualization, Supervision, Writing - review & editing, Data curation. **John M. Eagles:** Conceptualization, Writing - original draft, Writing - review & editing, Data curation.

Declaration of competing interest

Dr Robson is the main creator of the Temple Vie programme and treats patients on that programme.

Professor Eagles assisted in developing Temple Vie and acts as a counsellor on the programme.

References

- Astrup, A., Rossner, S., 2000. Lessons from obesity management programmes: greater initial weight loss improves long-term maintenance. *Obes. Rev.* 1 (1), 17–19.
- Bertoli, S., Leone, A., Ponissi, V., Bedogni, G., Beggio, V., Strepparava, M., et al., 2015. Prevalence of and risk factors for binge eating behaviour in 6930 adults starting a weight loss or maintenance programme. *Publ. Health Nutr.* 19 (1), 71–77.
- de Zwaan, M., 2001. Binge eating disorder and obesity. *Int. J. Obes.* 25 (S1), S51–S55.
- Dietz, W., Santos-Burgoa, C., 2020. Obesity and its implications for COVID-19 mortality. *Obesity* 28 (6), 1005–1005.
- Ersek, R., II, G., Salisbury, S., Salisbury, A., 1997. Noninvasive mechanical body contouring: a preliminary clinical outcome study. *Aesthetic Plast. Surg.* 21 (2), 61–67.
- Gormally, J., Black, S., Daston, S., Rardin, D., 1982. The assessment of binge eating severity among obese persons. *Addict. Behav.* 7 (1), 47–55.
- Hlubik, J., Stritecka, H., Hlubik, P., 2013. Bioelectrical impedance analysis or basic anthropometrical parameters for evaluating weight loss success? *Open Med.* 8 (5), 565–570.
- Jordan, R., Adab, P., Cheng, K., 2020. Covid-19: risk factors for severe disease and death. *BMJ* m1198.
- Klassen, A., Cano, S., Alderman, A., Soldin, M., Thoma, A., Robson, S., et al., 2016. The BODY-Q. *Plastic Reconstr. Surg. Glob. Open* 4 (4), e679.
- Lavie, C., Milani, R., Ventura, H., 2009. Obesity and cardiovascular disease. *J. Am. Coll. Cardiol.* 53 (21), 1925–1932.
- Madigan, C., Daley, A., Lewis, A., Jolly, K., Aveyard, P., 2014. Which weight-loss programmes are as effective as Weight Watchers®? *Br. J. Gen. Pract.* 64 (620), e128–e136.
- Marchesini, G., Montesini, L., El Ghoch, M., Brodosi, L., Calugi, S., Dalle Grave, R., 2016. Long-term weight loss maintenance for obesity: a multidisciplinary approach. *Diabetes, Metab. Syndrome Obes. Targets Ther.* 37.
- Ravussin, E., Ryan, D., 2017. Three new perspectives on the perfect storm: what's behind the obesity epidemic? *Obesity* 26 (1), 9–10.

Silver, J., 2020. Prehabilitation could save lives in a pandemic. *BMJ* m1386.

Wu, C., Chen, X., Cai, Y., Xia, J., Zhou, X., Xu, S., et al., 2020. Risk factors associated with acute respiratory distress syndrome and death in patients with coronavirus disease

2019 pneumonia in wuhan, China. *JAMA Intern Med.* 180 (7), 934–943. <https://doi.org/10.1001/jamainternmed.2020.0994>.

Xu, S., Li, Y., 2020. Beware of the second wave of COVID-19. *Lancet* 395 (10233), 1321–1322.