



Use of a novel algorithm to evaluate changes in diet quality following energy restriction

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Dietary strategies for weight loss typically place an emphasis on achieving a prescribed energy intake. Depending on the approach taken, this may be achieved by restricting certain nutrients or food groups, which may lower overall diet quality. Various studies have shown that a higher quality diet is associated with better cardiovascular (CV) health outcomes¹. This study aimed to evaluate the effect of an energy restricted diet on diet quality, and associated changes in cardiovascular risk factors. One hundred and forty adults (42 M:98 F, 47.5 ± 10.8 years, BMI 30.7 ± 2.3 kg/m²) underwent an energy restricted diet (30% reduction) with dietary counselling for 3 months, followed by 6 months of weight maintenance. Four-day weighed food diaries captured dietary data at baseline, 3 and 9 months and were analysed using a novel algorithm to score diet quality (based on the Dietary Guideline Index, DGI)². Total DGI scores ranged from 0-120, with sub scores for consumption of core (0-70) and non-core foods (0-50). For all scores, a higher score or increase reflects better diet quality. The CV risk factors assessed included blood pressure (SBP and DBP) and fasting lipids (total (TC), high and low-density lipoprotein cholesterol (HDL-C, LDL-C) and triglycerides (TAG). Mixed model analyses were used to determine changes over time (reported as mean ± standard error), and Spearman rho (r_s) evaluated associations between DGI score and CV risk factors. Dietary energy intake was significantly restricted at 3 months (-3222 ± 159 kJ, P<0.001, n = 114) and 9 months (-2410 ± 167 kJ, P<0.001, n = 100) resulting in significant weight loss (3 months -7.0 ± 0.4 kg, P<0.001; 9 months -8.2 ± 0.4 kg, P<0.001). Clinically meaningful weight loss (>5% body mass) was achieved by 81% of participants by 3 months. Diet quality scores were low at baseline (scoring 49.2 ± 1.5), but improved significantly by 3 months (74.7 ± 1.6, P<0.000) primarily due to reductions in the consumption of non-core i.e. discretionary foods (Core sub-score +4.0 ± 0.7, Non-core sub-score +21.31 ± 1.6, both P<0.001). These improvements were maintained at 9 months (Total score 71.6 ± 1.7, P<0.000; Core sub-score +4.4 ± 0.7 from baseline, P<0.000; Non-core sub-score +17.9 ± 1.6 from baseline, P<0.000). There were significant inverse relationships between changes in Total DGI score and changes in DBP (r_s = -0.268, P = 0.009), TC (r_s = -0.298, P = 0.004), LDL-C (r_s = -0.224, P = 0.032) and HDL-C (r_s = -0.299, P = 0.004) but not SBP and TG at 3 months. These data emphasise the importance of including diet quality as a key component when planning energy restricted diets. Automated approaches will enable researchers to evaluate subtle changes in diet quality and their effect on health outcomes.

Keywords: diet quality; algorithm; energy restriction; cardiovascular risk factors

Ethics Declaration

Yes

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References

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