Proceedings of the Nutrition Society (2024), **83 (OCE1)**, E100 doi:10.1017/S0029665124001186

47th Annual Scientific Meeting of the Nutrition Society of Australia and Nutrition Society of New Zealand, 28 November – 1 December 2023, Nutrition & Wellbeing in Oceania

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 outcomes[1]. 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/m^2) 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 +21.3.1 ± 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

Financial Support

This work was funded by the Almond Board of California. This funding source had no role in the design of this study or the analysis and interpretation of the data.

References

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