

An evaluation of the probability of adequate nutrient intake (PANDiet) and nutrient rich diet (NRD) scoring systems as metrics of diet quality for sustainable diet research in the Irish population

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Dietary changes are considered a key strategy for reducing the environmental impact of the food system⁽¹⁾. Sustainable diets need to be nutritionally adequate to ensure a healthier transition to lower environmental impact diets, and detailed insights into current nutritional intakes and sources of nutrients are required to inform this transition⁽²⁾. Diet scoring systems have been increasingly used in inter-disciplinary research as a measure of diet quality⁽³⁾⁽⁴⁾. The aim of this study was to assign multiple scoring systems to the Irish food consumption surveys and to evaluate these scores as diet quality metrics. The study was performed using data from the Irish National Adult Nutrition Survey (NANS; 2008–2010), the National Teens Food Survey II (NTFS II; 2019–2020) and the National Children's Food Survey II (NCFS II; 2017–2018). Nutrient rich diet scores (NRD9.3, NRD15.3) and probability of adequate nutrient intake (PAN Diet) scores were calculated for daily diets reported, with under-reporters removed where energy intake to basal metabolic rate was below 0.76⁽⁵⁾ (children n 2,375; teenagers n 798; and n 4,574 adults). European nutrient reference values were used as cut-off points⁽⁶⁾. ANOVAs, Spearman correlations and principal component analysis were carried out to evaluate scores against demographic factors, food intake and other diet quality metrics. All analyses were carried out using RStudio software v 4.1.1. For children, teenagers, and adults respectively, diet quality scores were 461, 417 and 459 for NRD9.3 scores; 518, 479 and 511 for NRD15.3 scores; and 61.7, 54.6 and 60.3 for the PANDiet scoring system. Lowest nutritional adequacy was found in teenagers for both genders, particularly for the male 16 to 18 years age group. In adults, young females (18–34yrs) had a significantly lower nutritional adequacy (58% PANDiet) compared to all other adult groups. Across all population groups, higher PANDiet scores were associated with males, those with a higher education level and those rurally located. In a more detailed food intake analysis in adults, 'High fiber breakfast cereals' positively contributed to all scores, and 'Butters, fats, and spreads' and 'Potato products and chips' were the only food categories which negatively contributed to all scores. While the NRD and PANDiet scores indicated similar results at a population level, the nutritional contribution of food groups differed between scores. The PANDiet scoring system represented the most comprehensive metric, covering 29 nutrients. This said, the use of multiple diet quality metrics may reduce the oversight of important sources of nutrients in sustainable diet research. The application of NRD9.3, NRD15.3 and PANDiet scores expands the compatibility of Irish food consumption databases with international studies. Nutrient scoring systems may prove a valuable metric for inter-disciplinary research in the future, particularly in the area of sustainable diets.

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