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Tailoring UK food-based dietary guidelines to older adults' nutritional preferences and needs using diet optimisation modeling

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In the UK, men and women can expect to spend approximately half of their remaining years from the age of 65 in good health. Nutritional needs change with age, with diet offering the potential to prevent and/or lessen the impact of poor health. Furthermore, specific Food Based Dietary guidelines (FBDGs) are required as older adults have specific nutrient needs.

There are gaps in the evidence on the role of dietary habits and/or specific nutrients in healthy ageing[(1)]. Much of the prior work focuses on those with chronic illness and disease. There is a limited evidence base addressing the issues of healthier older people living in the community[(2)], and it is important to prevent and/or correct nutritional deficiencies before the consequences become too difficult to treat. The objective was to identify a diet that meets the nutritional requirements for adults aged over 64-years-old with smallest divergence to the current average diet.

This study applied diet optimisation modelling (a method of finding the optimum diet under certain conditions/constraints) using national food and nutrient intake data from the National Diet and Nutrition Survey (years 1-11). Linear models were prepared using the open-source software R. Two models were developed for observed and recommended energy intake.

Constraints were included for energy, carbohydrate, free sugars, protein, salt, fat, saturated fat, alcohol, calcium, and red and processed meat. Constraints were informed by the Eatwell Guide (the UK's Food Based Dietary guidelines), government age*gender specific recommendations, and proposed recommendations from a literature review[(3)]. The linear model method was developed and trialled using data for a sub-population (women aged over 74 years n = 469).

In the observed/baseline diets the average daily energy intake for women over 74 years was 1517kcal, fibre was 17g, vitamin b12 9µg, fruit and vegetables 308g, and red and processed meat 52g. As a percentage of total energy, fat comprised 28%, protein 14%, saturated fat 12%.

Attempts to optimise with fibre and folate target levels at 30g and 400 µg increased fruit and vegetable intake (>500g). Optimising the diets with energy constrained at current levels reduced intake fat (-4 percentage points [%pt]), and vitamin b12 (-3µg). Intake increased for protein (+3%pt), calcium (+95mg), and fruit and vegetable intake (+211g). Constraining energy at 1840kcal resulted in protein increasing (7%pt), and fruit and vegetable intake (+394g). Fibre and folate levels were 22g and 310µg, respectively.

Preliminary results indicate that protein intakes in women aged over 74 years are sufficient to meet current FBDGs, but not the proposed level of 1.2g/kg without an increase in energy intake. In optimised diets maintaining the same energy intake, desired fibre and folate levels could only be achieved with greater, and potentially less acceptable divergence from the existing diet.

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