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Dietary assessment in the German National Cohort (GNC)

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Abstract

We describe a novel dietary assessment strategy to estimate usual food intake in the ongoing large-scale multi-center German National Cohort (GNC). The dietary assessment is based on three 24h food lists (24h-FL) and a food frequency questionnaire (FFQ) enriched by information from the representative German National Nutrition Survey II (NVS II). The novelty of this dietary assessment strategy is based on separating the probability of food intake from daily consumption amounts. The probability of consumption is estimated from 24h-FLs used in the GNC. To estimate daily consumption amounts, the already collected data of the NVS II are used. The 24h-FL simplifies the question on food consumption for all foods asked to consumption or not and so the questionnaire can be completed in about 10 minutes, reducing the burden on study participants. As proof of concept, we applied the assessment strategy to pretest data collected in 2012 to 2013 to assess the feasibility of the instruments. In brief, the novel dietary assessment strategy comprises three steps. First, the individuals' consumption probability is estimated by three 24h-FLs and one FFQ applying a logistic linear mixed model adjusted for characteristics of the participants. Second, person-specific daily consumption amounts are estimated from the NVS II applying a linear mixed model taking the characteristics of the participants into account. Third, usual food intake is estimated by the consumption probability multiplied by person-specific daily amounts. Usual intake of 41 food groups in 318 men and 377 women were estimated. Of those participants who completed the first 24h-FL, 84.4, and 68.5% completed the second and third 24h-FL, respectively. No associations were observed between probability to participate and lifestyle factors. The estimated usual food intake distributions were in a plausible range as shown by comparing the estimated energy intake to the energy needs approximated by estimated total energy expenditure. Total energy was estimated to be 2,707 kcal/day for men and 2,103 kcal/day for women. With a few exceptions, the estimated food-based consumption probabilities did not differ considerably between men and women. The differences in energy intake between men and women were mainly due to their differences in the estimated person-specific daily amounts. As a conclusion, plausible but not validated values for usual food intake were derived in the pretest study, so that the combination of three repeated 24h-FLs, an FFQ and person-specific daily amounts from an external source is a feasible strategy for dietary assessment.