ESM Methods

Definition of the dietary-pattern scores used for analysis

The alternative Healthy Eating Index (aHEI) has been proposed by McCullough et al in 2002 as an attempt to improve the original Healthy Eating Index in predicting chronic disease risk [1]. A modified version of the aHEI has been proposed in 2012 [2]. In our study, we decided to recreate the aHEI in its original version due to the lack of intake data on whole grains and sodium in the InterAct project, which are important components of the updated aHEI. Thus, the aHEI was formed by using intake data on vegetables, fruits, nuts and seeds, fibre from cereals and cereal products, alcohol, the ratio of white meat (poultry and fish) to red meat (including processed meats) intake and the ratio of polyunsaturated fat to saturated fat intake. Due to the unavailability of intake data for *trans*-fatty acids in the InterAct project, this component was not part of the aHEI in our study. We applied the same scoring system as McCullough et al [1] that assigns 0-10 points for each component according to the participant's intake (10 points: recommendations fully met, 0 points: least healthy dietary behavior). Subsequently, these points were summed to form the aHEI score.

The DASH diet was efficient in lowering blood pressure in a large clinical trial [3] and observational studies also suggest an inverse relationship with risk for diabetes [4, 5]. We constructed the DASH score based on the eight DASH food groups, *i.e.* grains, vegetables, fruits, dairy products, meat/poultry/fish, nuts/seeds/legumes, fats/oils and sweets [6, 7]. Similar to the aHEI score, 0-10 points were assigned to each of the eight dietary components (10 points: recommendations fully met, 0 points: least healthy dietary behavior) and finally summed to form the DASH score. We have separated the grain and dairy components into two items respectively, with one item scoring the absolute intake amount and the other item

scoring the fibre content of the consumed grains or the fat content of the consumed dairy products.

The three RRR-derived dietary-pattern scores were created as the sum of the standardised intake data of the individual food components (z-scores, transformation based on subcohort distributions). We applied a simplification approach to reconstruct the dietary patterns [8]; i.e. we selected indicator food groups of the dietary patterns (published factor loading > |0.2| or $p<0.05$ in stepwise regression with biomarker response score as dependent variable) and assigned the weights of '1' or '-1' to these indicator food groups. The first RRR-derived dietary-pattern score, named RRR1, was originally derived in the Nurses' Health Study using the six inflammatory markers IL-6, C-reactive protein (CRP), soluble intracellular cell adhesion molecule 1 (sICAM-1), soluble fractions of tumour necrosis factor α receptor 2 (sTNFR2), E-selectin and soluble vascular cell adhesion molecule 1 (sVCAM-1) as responses [9]. We recreated this score in InterAct by summing the standardised intakes of wine, coffee, cabbages and root vegetables and deducting standardised intakes of sugar-sweetened soft drinks, refined grains, processed meat and diet soft drinks. The score RRR2 was originally derived in the EPIC-Potsdam study [10] with the diabetes-related biomarkers HbA_{1c}, HDL-cholesterol, CRP and adiponectin as response variables. We reconstructed this score using standardised intakes of fruits (positive weight) and red meat, beer, poultry, legumes, sugar-sweetened soft drinks, processed meat and white bread (all negative weight). The score RRR3 was identified in the Whitehall-II study with the HOMA-IR index as response variable [11]. For the EPIC-InterAct study, this score was reconstructed with the standardised intakes of the food groups breakfast cereals, honey/jam/sugar, dressing sauces, non-white bread (all positively weighted) as well as diet soft drinks, sugar-sweetened soft drinks, processed meat, salty biscuits and white bread (all negatively weighted).

References

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