Institutionen för medicinsk epidemiologi och biostatistik

Diet in Epidemiology –
Assessment, Validity and Association with
Upper Respiratory Tract Infection

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ABSTRACT

This thesis covers the evaluation of two new interactive web- and meal-based food frequency questionnaires (FFQ). In addition, it investigates the potential association between dietary intake as well as physical activity and the susceptibility to upper respiratory tract infection (URTI).

In Paper I and II, the validity of Meal-Q and MiniMeal-Q as well as the reproducibility of Meal-Q was evaluated among 163 participants in the validation study VALMA. MiniMeal-Q is a shorter version of Meal-Q, including about 30% less food items. As reference methods, we used 7-day weighed food records (WFR) for energy and nutrients and doubly labeled water for energy expenditure. Evaluating ranking ability with the WFR, Meal-Q and MiniMeal-Q classified 69-90% and 67-89% of the participants into the same/adjacent quartile for energy, macro- and micronutrients and fiber, respectively. The corresponding proportion with the doubly labeled water was 77%. The correlation coefficients with the WFR ranged $r=0.33-0.74$ for macronutrients and $r=0.25-0.69$ for micronutrients and fiber, and was $r=0.18$ for energy. Correlations with the doubly labeled water were $r=0.42$ for Meal-Q and $r=0.38$ for MiniMeal-Q. Bland-Altman agreement plots with the WFR showed on average large variances and trends of increasing underestimation with increasing intakes. Regarding reproducibility, the intra-class correlations for Meal-Q ranged $r=0.57-0.90$ for energy and macronutrients and $r=0.50-0.76$ for micronutrients and fiber. The results were in line with previous validation studies on FFQs. Furthermore, both Meal-Q and MiniMeal-Q had a short answering time of 17 and 7 minutes, respectively and were rated as highly user-friendly by the participants.

In Paper III, we evaluated the adherence to the Nordic Nutrition Recommendations (NNR) as a measure of a healthy diet and susceptibility to URTI. In a prospective cohort study of four months among 1,509 participants aged 20-60 years, diet was assessed with a web-based FFQ and URTI was self-reported in five follow-up questionnaires. We found no association between overall adherence to the NNR and URTI. However, high physical activity was associated with an 18% reduced risk of URTI (incidence rate ratio (IRR) 0.82, 95% CI 0.69-0.97).

In Paper IV, we investigated the association between intake of antioxidants and polyunsaturated fatty acids and URTI. In a prospective cohort study among 1,533 participants aged 25-64 years, participants reported URTI events on their own initiative by phone or a web-based form during 9 months of follow-up. Diet was assessed with MiniMea-Q. We found that high dietary intake of vitamin C (IRR 0.69 (0.55-0.88)), vitamin E (IRR 0.77 (0.62-0.96)) and docosahexaenoic acid (DHA) (IRR 0.57 (0.39-0.83)) was associated with a reduced risk of URTI among women. No inverse association could be found among men, instead an increased risk of URTI was found for medium intake of vitamin E (IRR 1.42 (1.09-1.85)) and high intake of zinc (IRR 1.50 (1.04-2.16)) from food.

In conclusion, in Paper I and II we show that Meal-Q and MiniMeal-Q are two user-friendly FFQs with short answering time and good ranking ability of most nutrients. In Paper III, we found that high physical activity reduced the risk of URTI. Moreover, in Paper IV, high dietary intake of vitamin C, vitamin E and DHA was associated with a reduced risk of URTI among women. In contrast, medium vitamin E and high zinc intake from food was associated with an increased risk of URTI among men.