Karolinska Institutet

**Institutionen för medicinsk epidemiologi och biostatistik**

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

AKADEMISK AVHANDLING
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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 MiniMeal-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.


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