



Applications and modifications of the Mediterranean diet index in the Nordic context

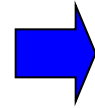
Gianluca Tognon, Elisabet Rothenberg, Lena Nilsson, Berit L. Heitmann, Karen Walker,
Anna Winkvist and Lauren Lissner

The Mediterranean dietary pattern

- One of the most cited examples of *a priori* pattern, repeatedly shown to be positively associated with good health
- The relative adherence to it has been evaluated through different versions of the Mediterranean Diet Score (Trichopoulou et al. 1995)

Mediterranean diet score (MDS)
(Trichopoulos et al., BMJ 1995)

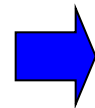
- High intake of cereals, fruit, vegetables, legumes
- Moderate intake of ethanol
- Higher proportion of MUFA versus SAFA
- Low intakes of meat, dairy products



8 – level score calculated on sex-specific median of intakes

Modified Mediterranean diet score (mMDS)
(Trichopoulou et al., NEJM 2003)

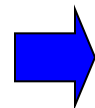
- High intake of cereals, fruit **and nuts**, vegetables, **fish**, legumes
- Moderate intake of ethanol
- Higher proportion of MUFA versus SAFA
- Low intakes of meat, dairy products



9 – level score calculated on sex-specific median of intakes

Modified Mediterranean diet score (mMDS)
(Knoops et al., JAMA 2004)

- High intake of cereals, fruit, vegetables **and potatoes**, fish, legumes/nuts/**seeds**
- Higher proportion of MUFA versus SAFA
- Low intakes of meat, dairy products



8 – level score calculated on sex-specific median of intakes

Aim of this study:

Can we do it even better?

- a) **Variations intended to more accurately capture a healthy pattern:** replacement of total cereals with wholegrain cereals, inclusion of eggs and the ascertainment of single ingredients included in mixed dishes and recipes
- b) **Variations intended to tailor the score to the habits of Nordic populations:** inclusion of PUFA (fish contribution), the comparison of alcohol with red wine intake (less likely to be associated with unhealthy drinking)

STATISTICAL METHODS

- The association of both the Mediterranean diet score(s) with total and cause-specific morbidity/mortality was assessed
- Survival analyses by means of Cox Proportional Hazard Model adjusted for age, BMI, smoking status, physical activity and education

The gerontological and geriatric population study H70

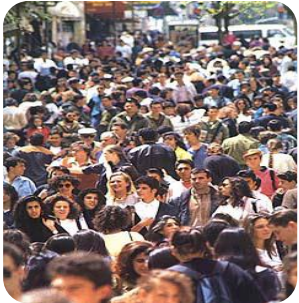


- 1,037 (48% women) 70-year old subjects
- Diet history examination (> 200 food items)
- Maximum mortality follow up: 38 years (mean: 22.4 years)

Score refinement: substituting cereals with wholegrain cereals, including eggs and PUFA, comparison of total alcohol with red wine.

Mediterranean diet score (MDS)	N cases	HR (95% CLs)
mMDS Knoops et al (2004)	718	0.97 (0.92; 1.02)
Refined mMDS 1 (total alcohol)		0.93 (0.89; 0.98)
Refined mMDS 1 (red wine)		0.92 (0.87; 0.97)

The Västerbotten Intervention Program (VIP)



- The largest population study on nutrition in Europe (N = 90,308)
- 73,984 subjects (51 % women) included in the analyses
- Food Frequency Questionnaire (64 food items)
- Maximum mortality follow up: 18 years (mean: 10 years)

Score refinement: Wholegrain cereals, comparison of total alcohol with wine.

Cause of mortality	<i>n</i> cases	Men, <i>n</i> = 35,950	<i>n</i> cases	Women, <i>n</i> = 38,034
All-cause mortality	1,453	0.96 (0.93, 0.99)	923	0.96 (0.92, 1.00)
Total cancer	493	0.93 (0.88, 0.99)	481	0.98 (0.93, 1.04)
- Pancreas	47	0.83 (0.69, 0.99)	45	0.84 (0.70, 1.01)
Card. diseases	499	0.98 (0.93, 1.04)	181	0.92 (0.83, 1.00)
- Myocardial Infarction	244	0.97 (0.90, 1.05)	61	0.85 (0.72, 0.99)
- Stroke	79	0.97 (0.84, 1.12)	65	1.03 (0.88, 1.20)

CONCLUSIONS

- For the Mediterranean diet score, we were able to show an inverse association with both morbidity and mortality, consistently replicated in three Scandinavian cohorts
- In smaller studies, highly detailed dietary assessment methods may be required to identify the healthiest and most population-specific patterns
- This approach can be applied to evaluate different patterns such as a western (unhealthy) diet and the Nordic healthy diet in relation to health status



THANKS FOR YOUR ATTENTION!

Gianluca Tognon
gianluca.tognon@gu.se