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► **To cite this version:**

M Gerber, J Scali, Mh Avallone, C Teisson. MEDHEA: a nutritional survey in Mediterranean countries. First results in département de l'Hérault, France. *Reproduction Nutrition Development*, 1997, 37 (3), pp.345-346. <hal-00899987>

HAL Id: hal-00899987

<https://hal.science/hal-00899987v1>

Submitted on 11 May 2020

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Validation of a food frequency questionnaire. II. Nutrients and biochemical markers. C Bonifacj¹, M Gerber², J Scali², C Astre², JP Daurès¹ (¹ *Unité d'épidémiologie, de biostatistiques et de recherche clinique*; ² *Groupe d'épidémiologie métabolique, IURC, 34000 Montpellier, France*).

Validation of the food frequency questionnaire was also conducted on nutrients to ensure comparison with other studies in the literature. The need for accurate measures of habitual diet in epidemiology has prompted numerous studies on diet assessment in various countries [Pietinen et al (1988), *Am J Epidemiol* 128, 655-666; Engle et al (1990), *Nutr Cancer* 13, 281-292; Liu et al (1992), *Epidemiology* 3, 496-502; Rimm et al (1992), *Am J Epidemiol*, 135, 1114-1126; Martin-Moreno et al (1993), *Int J Epidemiol* 22, 512-519; Bingham et al (1994), *Br J Nutr* 72, 619-643; Gnardellis et al (1995), *Epidemiology* 6, 74-77; Decarli et al (1996), *Ann Epidemiol* 6, 110-118]. However, dietary habits vary from country to country, but also from region to region, implying that for nutritional surveys conducted in a geographically and/or culturally distinct region, a specific questionnaire must be validated.

The same technics of dietary intake assessment as described in the abstract I were used, as well as the same statistical analysis. These technics have been completed by the use of biological markers, plasma β -carotene, and urinary nitrogen and potassium as described by Bingham et al (1995), *Br J Nutr* 73, 531-550).

The energy-adjusted Pearson correlation coefficients between PETRA and the 7-day record ranged from 0.32 for vitamin E to 0.81 for vitamin C (mean: 0.69 for the 23 nutrients). There was practically no misclassification. For FFQ, the de-attenuated energy-adjusted Pearson correlation ranged from 0.22 for proteins and monounsaturated fatty acids to 0.80 for iron (mean: 0.48). Misclassification occurred for 10% or less of

the subjects (except for vitamin C, 12%). Correlation coefficients were high (> 0.5) and misclassification low ($< 3\%$) when the range of nutrients was large and/or FFQ between-person variance high.

Partial and direct correlations between dietary and plasma nutrients were higher than those reported in the literature for the FFQ and comparable for the check list 7-day record (plasma β -carotene vs FFQ and 7-day record carotene intake, 0.31 and 0.44, respectively; urinary nitrogen vs FFQ and 7-day record protein intake 0.40 and 0.43, respectively; urinary potassium vs FFQ and 7-day record potassium intake, 0.20 and 0.41, respectively).

However, a correlation between measurements demonstrates validity only if it exists because each of the assessment actually measures the same thing and not because the errors are correlated. We computed also the correlations according to the statistical model described by Kaaks et al (1994), *Stat Med* 13, 127-142, using the three different intake assessment methods for which correlation of random errors are the least likely: FFQ, PETRA and the biological marker. For β -carotene, we showed a p value of 0.35 for FFQ, 0.50 for PETRA and 0.83 for the plasma β -carotene with the estimated true intake (method of the triade).

MEDHEA: a nutritional survey in Mediterranean countries. First results in département de l'Hérault, France. M Gerber, J Scali, MH Avallone, C Teisson (*Groupe d'épidémiologie métabolique, Inserm-CRLC, 34298 Montpellier cedex 5, France*).

The general objective of the Medhea study is to promote Mediterranean diet, considered as a model of healthy diet. The Mediterranean diet is increasingly cited in scientific circles as an example of healthy nutrition as far as cardiovascular illnesses

and cancers are concerned [review in Corpet et Gerber (1996), *Med Nutr*; Gerber et Corpet (1996), *Med Nutr*]. However, this diet takes various forms in different countries and its protective element(s) – whether it would be nutrient(s), specific food(s), food group(s), or eating habit(s) remains unknown.

The specific objectives of this study are the following: 1) to precise the various Mediterranean diets in different countries (Southern France, Italy and Spain) through quantitative and qualitative nutritional surveys and to compare with Northern countries (South-West and East of France, England, Belgium). The foods and the nutrient showing the largest variation of intake among these countries will be correlated with health indexes (cardio-vascular mortality and cancer incidence); 2) to evaluate changes in food habits and to understand why people are changing; 3) to identify the socio-economic limits and constraints to maintain this model in Mediterranean countries and its extension to Northern countries. To fulfill these objectives a multidisciplinary approach is followed, gathering nutritional epidemiologists, nutritional anthropologists and socio-economists.

Preliminary results of the quantitative nutritional survey of 438 subjects among the representative sample from département de l'Hérault show that the mean nutritional balance is good and indicative of the keeping of Mediterranean diet (high consumption of vitamins from fruit and vegetables and of vegetable oils shown in the PUFA/SFA ratio). Women eat less of everything than men, but more yoghurts, olive oil, fruit and vegetables, that results in more carotenoids and vitamin C. This difference between men and women is the same as between urban and rural subjects, respectively. Young people eat more of everything than aged subjects except for the Mediterranean foods: fish and sea-food, fruit and vegetables, olive oil and other vegetal oils,

and wine, which is an indication of the possible disappearance of the Mediterranean diet in our region. Certain population groups display peculiar behaviour: rural women appear to keep the traditional local food habits, with more cabbage, more delicatessen, more olive oil, and more wine than the other women; retired people meet the characteristics of the healthiest diet, close to the Mediterranean diet, but it remains to precise whether this choice is dictated by tradition or by health concerns. Finally, urban, single, unemployed or without profession women appear to favour high caloric food, bread but also delicatessen, pastries and sweets, and wine whereas the intake in fish, poultry, vegetables, citrus and vegetal oils is very low. Moreover, they attend twice as much the fast-food places than the other women of the sample.

Dietary underreporting and cognitive restriction in obesity. JM Oppert, A Basdevant, C Craplet, M Cottini-Passos, B Guy-Grand (*Service de médecine et nutrition, Hôtel-Dieu, 75004 Paris, France*).

Dietary underreporting is increasingly recognized as an important bias in the study of associations between nutrition and health.

The aim of this study was to identify characteristics of subjects considered as underreporters (UR) in a sample of obese patients (body mass index, BMI ≥ 27 kg/m²) at their first visit to a Nutrition department, and especially to investigate relationships between underreporting and dietary cognitive restriction.

419 obese patients (336 females/83 males, age: 41.7 ± 0.6 year, BMI: 37.5 ± 0.5 kg/m², $m \pm SEM$) including 151 (36%) morbid obese subjects (BMI > 40) were studied (dietary history, presence of restriction). Subjects that were losing weight were excluded. Using the methodology described by Goldberg et al [Goldberg et al (1991),