Compliance with French nutritional recommendations, estimated as a score, and socioeconomic characteristics in 18-74-year-old adults
The French nutrition and health survey (ENNS, 2006-2007)

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Introduction

- The capacity of nutritional policies to account for socioeconomic disparities is a major issue. National surveys are useful to identify barriers of adherence to diet and physical activity recommendations.

- Besides, describing such recommendations by using scores enables a comprehensive description of the nutritional situation.

- The relationship between social, economic and educational characteristics and poor compliance with French nutritional recommendations was investigated in the French nutrition and health survey ('Etude nationale nutrition santé', ENNS, 2006-2007).[1]

Methods

- National cross-sectional survey including 3,115 18-74-year-old adults; sample selection based on a three-phase design.

- Food intake estimated through three 24-h recalls randomly distributed within a two-week period and carried out by phone. Socio-economic status (SES) was assessed through face-to-face standardized questionnaires.

- Adherence to French nutritional recommendations estimated using the "Programme national nutrition santé"-guideline score (PNNS-GS) which accounts for diet and physical activity guidelines.[2]

- Gender-stratified multiple logistic models used to identify characteristics associated with poor compliance with recommendations.

Results

- Among 3,115 adults included, 381 were under-reporters (Black's method) and 157 had missing information on SES status (n=2,577 included in analysis). For 15 theoretical points maximum, mean PNNS-GS was 7.67 ±0.17 in men and 8.55 ±0.12 in women.

- **Table 1:** "Healthy" thresholds were attained by less than 40% of adults for whole grain food, seafood and dairy products in both genders, for salt in men and for "bread, cereals, potatoes and legumes" in women.

Table 1: Proportion of subjects meeting PNNS recommendations

PNNS recommendations[a]	Men %	Women %
Fruits and vegetables: ≥ 5 serv./d	44.2	44.3
Bread, cereals, potatoes and legumes: 3-6 serv./d	59.0	38.9
Whole grain food: 2/3 serv./d	13.5	19.4
Milk and dairy products: 2.5-3.5 serv./d[b]	31.2	28.5
Meat, poultry, seafood and eggs: 1-2 serv./d	50.4	54.4
Seafood: ≥ 2 serv./w	27.9	32.3
Added fats: < 16% EI	86.9	81.9
Type of added fats: vegetable AF/total >50%	41.5	47.5
Sweetened foods: <12.5% EI	74.4	74.8
Beverages		
Non-alcoholic beverages: ≥1L water & ≤250ml SB	67.4	71.6
Alcohol: ≤ 20 g/d women & ≤ 30 g/d men	80.1	94.0
Salt: < 8 g/d	29.2	70.0
Physical activity: ≥ moderate IPAQ	64.1	63.9
Mean number of recommendations met	**6.7**	**7.2**

[a]serv., servings; EI, total energy intake excluding alcohol; SB, sweetened beverages; IPAQ, international physical activity questionnaire. [b]2.5-4.5 in 55-74-y-old subjects.

Table 2: Factors associated with low PNNS-GS quartile vs. three others

	Men ORa	Men 95% CI	Women ORa	Women 95% CI
Age				
55-74 years old	1.00		1.00	
30-54 years old	2.26	1.16-4.42	1.79	1.04-3.10
18-29 years old	3.65	1.63-8.16	3.35	1.80-6.24
Marital status				
Married / cohabitating			1.00	
Single / separated / divorced / widowed			1.43	1.01-2.04
Occupation				
Management / intermediate profession	1.00		1.00	
Self-employed / agricultural worker	0.91	0.38-2.15	2.37	1.05-5.34
Manual worker / employee	1.70	0.99-2.91	1.28	0.82-2.02
Retired	1.92	0.83-4.44	1.00	0.49-2.00
Homemaker, disabled person, other	3.07	1.36-6.91	1.56	0.95-2.58
Education level				
University	1.00		1.00	
High school	1.19	0.62-2.26	1.49	0.93-2.39
Secondary school	1.06	0.63-1.76	1.39	0.89-2.19
Primary school	1.34	0.56-3.17	1.23	0.70-2.19
Holiday trip in the past 12 months				
Yes	1.00			
No	1.78	1.05-3.02		

Final multivariate analysis models. Complex survey design and calibration on national census accounted for in all analyses.

- Quartiles were: Q1: ≤6.30; Q2:]6.30-7.75]; Q3: 7.75-9.00] and Q4: >9.00 in men and Q1: ≤7.30; Q2:]7.30-8.55]; Q3:]8.55-9.80] and Q4: >9.80 in women. In both genders, a difference of approximately 4 attained recommendations was observed on the average between the lowest and highest quartiles (data not tabulated).

- **Table 2**: Low compliance with PNNS-GS (1st quartile) was significantly associated with lower age and lower occupational status for both genders. Moreover, women living without a partner were at higher risk of poor compliance with recommendations (*versus* living with a partner), as were men not having taken a holiday trip during the past 12 months *versus* at least one holiday trip (used as a marker of low income).

Conclusion

- The mean PNNS-GS shows that compliance with nutritional recommendations can be still improved in France, despite six years of active public health interventions through the PNNS.[3] Limitations of our analyses (three 24-h recalls, use of an 'a priori' score,[4] bias of participation despite correction through calibration) have to be taken into account in this conclusion.

- Identification of socioeconomic characteristics involved in poor compliance to recommendations, described as a whole, should help to target future public health measures. In France, poor adherence to recommendations could be linked not only to poor access to information but rather to the high cost of healthy food due to low income in some sub-groups.[5]

References
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