Relationship Between Biochemical Parameters, Diet and Health Status in the Rural Community of Venaus (Val Cenischia)

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Introduction

Eating habits in industrialised societies have been changing, and the changes have been both qualitative (increased intakes of saturated fats, animal proteins, and simple carbohydrates) – and quantitative (excessive consumption). Overweight and obesity may be the important risk factors for development of cardiovascular diseases, metabolic disorders and chronic-degenerative diseases. Cardiovascular diseases, in particular, are diseases with a complex pathogenesis in which the role of genetic factors is of great importance. The interaction of genetic, environmental and cultural factors determines the expression of some biochemical and physiological characteristics, such as plasma lipids (cholesterol and triglycerides) and blood pressure.

In scientific literature is widely documented a relationship between increased cholesterol levels (especially of non-HDL cholesterol) and increased mortality of atherosclerotic disease.

The present study examine the relationship between the composition of diet, biochemical parameters and health status and analyze changes in eating habits between generations in people living in Venaus, rural community of Val Cenischia (Western Alps).

These mountain populations, thanks to their environmental and demographic characteristics, offer a sample valid enough to enable us to calculate the effects of diverse factors, such as life-style and nourishment, upon the state of people's health, and upon the processes of ageing (Boetsch et al., 1996a; Boetsch et al., 1996b).

Materials and Methods

The pilot survey was conducted on 114 subjects of both sexes, 82 subjects aged ≥ 65 years and 32 subjects aged 18-32 years, belonging to family group of Venaus, whose origins and settlements in the community date back at least three generations.

The interviewees were required to reply to a predefined questionnaire investigating the types of nourishment consumed, and their frequencies each week. It has been noted (as we have said) that a correct type of nourishment, plus a moderate amount of physical exercise, are factors which contribute to the psycho-physical well-being of the subject - whilst overweight and obesity may instead represent important factors in the genesis of risks attending the growth of metabolic disorders, and cardiovascular and chronic degenerative pathologies. In order to assess the health status and the possible risk of diseases (cardiovascular and / or metabolic disorders) on the sample, five biochemical parameters were analyzed: glucose, triglycerides, total cholesterol, HDL, LDL, and the dosage of the enzyme gamma-glutamyltransferase (GGT).

Results

From a qualitative and quantitative analysis of the foods most frequently consumed it emerged that the supply of energy, of macro and micro nutrients, is, generally-speaking, sufficient for all the people under study.

The elaboration of the data was performed through OGP software (2004 – 2007), a program of nutrition education used to calculate errors in diet. It failed to discover, on the whole, significant defects or excesses in the average intake of nutrients in the sample while in the young sample there is a greater supply of protein and lipids than the recommended dose and in the male sample a significant intake of cholesterol (Tab. 1 and 2).

We compared the weekly portions of some nourishment consumed. It showed certain differences that reflect the change in diet over time.

In fact it showed a higher consumption of foods in the old sample, typical of alpine diet, such as milk and dairy products and potatoes.

However, the comparison was statistically significant only in the female sample: Mann-Whitney Test: U=351,5; DF=24,18; P<0,05; Mann-Whitney Test: U=312,5; DF=24,18; P<0,05.

This finding may indicate the elderly's tendency to maintain a dietary pattern closer to the traditional one.

In contrast, the young sample shows a preference for the cold cuts (males Mann-Whitney Test: U=321,0; DF=26,15; P<0,05; female Mann-Whitney Test: U=381,0; DF=24,18; P<0,05).

Men	Average intakes recommended OGP	Age 18 – 26 N=16	Age ≥ 65 N=30
Carbohydrates	282 g	316,2 g	300,6 g
Proteins	62 g	127,8 g	90,2 g
Lipids	70 g	106,6 g	77,3 g
Saturated fat	Max 28 g	42,8 g	30,8 g
Cholesterol	< 300 mg	472,4 mg	316,9 mg
Vitamin D	0 – 10 µg	4,6 µg	5,46 µg
Calcium	1000 mg	840,9 mg	1029,2 mg
Fe	10 mg	14,4 mg	16,8 mg
Omega 3	1,5 g	1,5 g	1,3 g
Fiber	25 g	29,2 g	23,2g
Folic acid	200 µg	344,8 µg	287,2 µg

Tab. 1. *Average intake of macro-and micronutrients in the male sample.*

Women	Average intakes recommended OGP	Age 18 – 26 N=18	Age ≥ 65 N=40
Carbohydrates	250 g	241,8 g	248,1 g
Proteins	53 g	83,3 g	83,3 g
Lipids	50 g	72,7 g	48,1 g
Saturated fat	Max 20 g	28,9 g	27,4 g
Cholesterol	< 300 mg	284,8 mg	278,9 mg
Vitamin D	0 – 10 µg	2,9 µg	2,7 µg
Calcium	1200 – 1500 mg	658,4 mg	887,2 mg
Fe	10 mg	10,5 mg	9,8 mg
Omega 3	1 g	1 g	0,9 g
Fiber	25 g	26,4 g	24,9 g
Folic acid	200 µg	301,6 µg	273,6 µg

Tab. 2. *Average intake of macro-and micronutrients in the female sample.*

Furthermore, young males consume more meat (Mann-Whitney test: U = 345.5, DF = 26.15, P <0.05), fish (Mann-Whitney test: U = 293.5, DF = 26.15, P <0.05) and vegetables (Mann-Whitney test: U = 281.0, DF = 26.15, P <0.05).

The analysis of biochemical parameters and GGT in general has not shown worrisome risk factors for cardiovascular or metabolic diseases (Graphic 1 and 2).
The biochemical values of the elderly were higher than those for young. Statistical tests used for the comparison give significant results for glycemia, total cholesterol, triglycerides and GGT both male and female sample. For females also LDL.
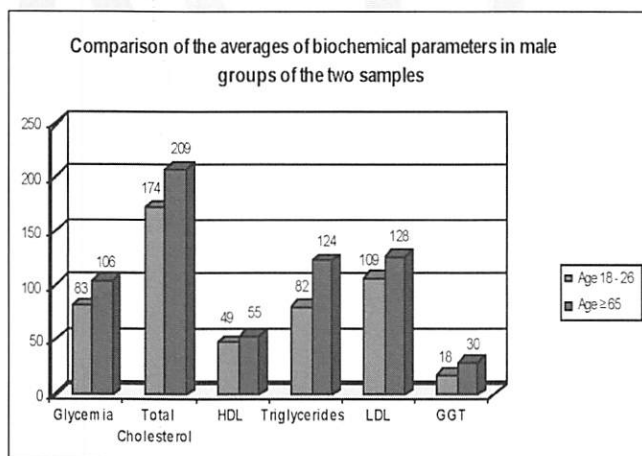
Graph. 1. *Comparison of the averages of biochemical parameters in male groups of the two samples.*
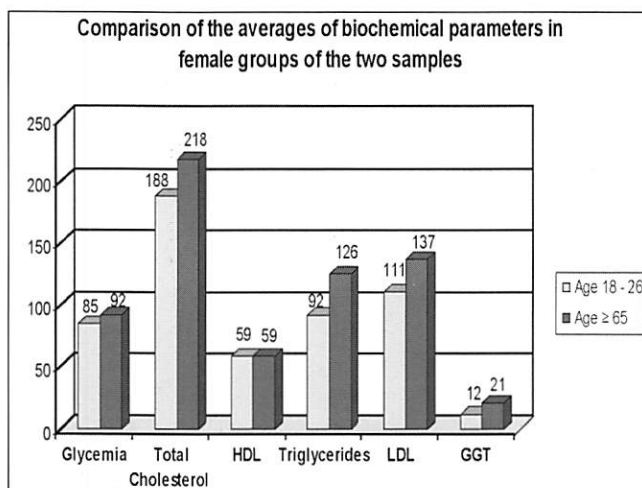
Graph. 2. *Comparison of the averages of biochemical parameters in female groups of the two samples.*

It 'still showed the key role of adipose tissue in the regulation of cardiovascular risk factors in young males: it seems that overweight begins at a young age and exerts an influence on total cholesterol values as shown by the positive correlation between BMI and total cholesterol (mg/dl) (Pearson: R=0,426; P=0,015).

Discussion

An appropriate nutrition not only permits us to confront the energy expenditures associated with our daily activities, but it also helps us to experience an improvement in the quality of our lives. A correct nutritional discipline, based

upon a balanced diet, and complete with all the essential nutrients, plus an adequate quantity of physical exercise, are closely correlated to our state of health and longevity.

Acknowledgments

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OGP-Educazione Nutrizionale 2004-2007. OSC MEDIA Scientific Publishing, Bologna.