

## METABOLIC BENEFITS OF FOOD IN DYSLIPIDEMIA – THE INFLUENCE ON PARACLINICAL CHANGES AND ON THE PATHOLOGICAL STATUS

Bei Mariana \*, Mirescu Claudiu \*\*, Anchidin Ovidiu \*\*\*, Oșvat Marius \*, Jude Eugen \*, Ciavoi Gabriela \*\*\*\*, Domocos Daniela \*\*\*\*

\*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048, Oradea, Romania, e-mail: [marianaf.bei@gmail.com](mailto:marianaf.bei@gmail.com)

\*\*Babeș-Bolyai University, Faculty of Biology and Geology, Cluj-Napoca, 5-7 Clinicilor St., 400006, Cluj-Napoca, România, e-mail: [claudiu.mirescu@gmail.com](mailto:claudiu.mirescu@gmail.com)

\*\*\*"Niculae Stancioiu" Heart Institute, Cluj-Napoca, Calea Moșilor 19-21 St., 400001, Cluj Napoca, România, e-mail: [anchidin\\_ovidiu@yahoo.com](mailto:anchidin_ovidiu@yahoo.com)

\*\*\*\*University of Oradea, Faculty of Dental Medicine, P-ta 1 Decembrie 5, Oradea, Romania, e-mail: [danadd769@gmail.com](mailto:danadd769@gmail.com)

### Abstract

*Assessing the metabolic benefits of a rational diet recommended in a particular pathology involves knowing all the nutritional aspects that can lead to a reduced degradation of the metabolic processes or, in undesirable situations, to the degradation of these processes. In order to quantify the metabolic and nutritional benefits of food on cardiometabolic pathologies, all aspects of the functions that each food prescribed in the nutritional plan has to fulfil must be known.*

*The nutritional analysis and the analysis of the impact of food quality included in the nutritional plans specific to dyslipidemias and to associated pathologies aimed to assess the metabolic benefits of food on the paraclinical markers specific to these pathologies. Paraclinical parameters highlighted the importance of the nutritional plans that must be based on the scientific data of paraclinical parameters correlated with the pathological status.*

**Key words:** healthy diet, metabolic benefits, dyslipidemia, atherosclerosis

### INTRODUCTION

Cardiovascular diseases, particularly atherosclerotic dyslipidemias, have become a global epidemic. According to Murray and Lopez, 1996, by 2020 cardiovascular diseases (CVD) will be responsible for the death of 25 million people worldwide.

According to the American Heart Association (AHA), by 2030, the prevalence of cardiovascular diseases is expected to increase by 9.9% and the prevalence of heart failure and stroke is expected to increase by about 25% (Heidenreich et al. 2011)

Mozaffarian, 2016 considers that diet-related diseases such as cardiometabolic diseases, including coronary heart disease, stroke, type 2 diabetes and obesity have become an essential factor of study nowadays.

Thus, in order to assess the metabolic benefits of a diet, of a nutritional style, of a nutritional profile, we must consider the five pillars of proper nutrition (Besson et al., 2000, quoted by Banu et al., 2011), namely:

- people's nutrition must be quantitatively and qualitatively conscious;
- the intake of vitamins and minerals must be sufficient, correlated with the requirements of the body, mainly due to a very stressed modern life, especially psychical stress;
- the diet must be conceived as to maintain the biological balances, as a constant of life, depending on the body's inner/outer conditions;
- to help the body maintain its acid-base balance, a scientific compromise is needed between acidifying and alkalizing foods;
- to record psycho-emotional disorders that greatly influence a series of imbalances in the body.

The quality and types of foods consumed influence the various metabolic pathways. Thus, nutritional interventions are complex, including at an individual, social, cultural, community, agricultural, industrial, governmental and global level. These interventions are based on strong and effective evidence (Mozaffarian et al., 2012) that lead to the development of several strategies of improving the health system, the health policies and, last but not least, to the setting up of more individual strategies (Afshin et al., 2014 quoted by Mozaffarian, 2016).

Prabhu et al., 2013 believed that atherosclerosis is a major health condition in both developing and developed countries because it acts rapidly and represents the major aetiologic factor in vascular obstructive diseases, mainly stroke, peripheral vascular diseases and cardiovascular diseases. The authors consider the approach on atherosclerosis by using food constituents an attractive concept that can, at the same time, pose a challenge for those who want to study this subject.

Sigal et al., 2013 stated that lifestyle, including diet, plays an important role in the aetiology of cardiovascular diseases (CVD) preceded by cardiometabolic pathologies.

## **MATERIAL AND METHOD**

The methods of analysis have been chosen so that to point out as accurately as possible the metabolic benefits of diet on the reduction of the pathological status of atherosclerotic dyslipidemic diseases.

**The clinical method** of analysis included nutritional anamnesis and objective examination, applied for a judicious clinical evaluation of patients' physiological and nutritional status, respectively pathological disorders that occurred and that are revealed by paraclinical analyses specific to dyslipidemias and associated pathologies. This method involves the

analysis of the studied pathological events, correlation of the cases and medical supervision.

**The nutritional method of analysis** assessed the nutritional intake, the nutritional anamnesis that aimed at collecting information on the amount and type of ingested foods, nutrition and energy balance based on the composition of the food ingested over a day.

The method of assessing the energy input is one of the most important stages in achieving the balance of the nutrition diagnosis.

The methods of assessing energy inputs are represented by *food surveys* that can provide information on the nutritional consumption of an individual or of a group. We must say from the very beginning that there is no method to allow an accurate assessment of food intake. But these methods are essential in determining food disorders and need to be completed by paraclinical analyses as to establish a real nutritional plan with beneficial effects of risk reduction.

**The paraclinical methods** aimed at:

1. Assessing the laboratory analysis report specific to dyslipidemiant pathologies at the beginning of the study and after 6 weeks of hygienic-dietetic regime provided in the individualized nutritional plan for each patient.

The assessed paraclinical indicators were:

1. Total cholesterol and fractions of cholesterol - LDL and HDL
2. Triglycerides
3. Transaminases - TGO and TGP
4. Bilirubin

## RESULTS AND DISCUSSION

The study on the evolution of the measured paraclinical parameters compared to the reference values after a 6-week diet (Table 1) shows that nutritional treatment is an important factor in the evolution and prognosis of atherogenic dyslipidemias and, when correlated with the medication prescribed by the cardiologist, may reduce significantly the risk of atherogenic relapses.

The values of the total cholesterol lowered after 6 weeks of diet although these values were at the highest level in 50% of the cases, high in 20%, and ideal in 30% of the cases.

After 6 weeks of nutritional treatment, the HDL-C values slightly increased, exceeding in all cases the value of 40 mg/dL considered of high risk for cardiovascular diseases. The lowest value was of 43 mg/dL registered at one of the ten patients studied. One patient of the ten registered

values of HDL-C higher than 60 mg/dL even at the start of the study when the level of HDL-C measured 78 mg/dL.

*Table 1*

Prognosis of the measured paraclinical parameters compared to the reference values after a 6-week diet

No.	Surname , First name	Age	Sex	CT	Referen ce value TC	HDL- C	Reference value TC	LDL-C	Reference value TC	TG	Referenc e value TC
1	BR	47	M	189	200	45	40	125	100	62	150
2	BF	43	F	192	200	54	40	109	100	112	150
3	SM	65	F	189	200	70	40	90	100	102	150
4	DVL	55	M	250	200	54	40	130	100	280	150
5	DAI	45	M	215	200	44	40	128	100	96	150
6	BV	65	F	223	200	53	40	154	100	95	150
7	GS	43	M	248	200	47	40	153	100	147	150
8	VA	51	M	221	200	45	40	152	100	112	150
9	JD	40	M	204	200	43	40	108	100	121	150
10	DIL	48	M	210	200	46	40	121	100	138	150

LDL-C values decreased in all patients after 6 weeks of nutritional treatment, remaining above the ideal limit in 60% of the cases, increased to the limit in 30% of the cases. In one of the ten patients the value of LDL-C was ideal even at the start of the study (87 mg/dL).

The values of the total cholesterol decreased in 90% of the cases (Table 2), after 6 weeks of nutritional treatment, by approximately 10% except for one of the ten patients in whom the total cholesterol increased by approximately 10% but not exceeding the ideal value.

HDL-C values increased percentually in higher limits, ranging from 3.84% to 18.42% in 70% of the cases. In 20% of the cases, HDL-C values decreased by 8.97% and by 9.64%, respectively.

In one patient HDL-C increased by 43.3%, being an atypical case since the initial value of HDL-C of 30 mg/dL was registered after a 40-day drastic (religious) fasting followed by a 3-day physical and mental exercise, which coincided with the onset of malaise and the subject's decision to evaluate his paraclinical parameters. This case shows the primordial role of nutrition and the metabolic benefits induced by a balanced nutrition that consists of a correct rationalization in order to reduce any risk of developing pathologies, especially food-borne ones.

Table 2 shows that LDL-C values were lower in 90% of the cases, ranging from 7.72% to 9.42%. In one of the studied subjects the level of LDL-C decreased by 17.48%, probably due to the combined effect of statins with ezetimibe, a non-statin agent that inhibits the intestinal absorption of the cholesterol, leading to the decrease of LDL-C (Agarwala et al., 2016), at the advice of the cardiologist.

The atherogenic index presented a rising trend, ranging from 10.47% to 15% in 90% of the cases, except for a patient whose atherogenic index dropped by 9.25% , percentage that did not decrease the atherogenic index below the recommended value of 0.30 (Table 2). This decrease is caused by the reduction in the value of HDL-C which, at the start of the study, was of 78 mg/dL, high compared to the reference value for this parameter.

*Table 2*

Prognosis of the paraclinical markers after a 6-week nutritional treatment

No.	Surname, First name	Age	Sex	CT		HDL-C		LDL-C		AI = DL-c:TC	
				mg/dL	%	mg/dL	%	mg/dL	%		%
1	BR	47	M	189	9.78	45	18.42	125	-17.48	0.24	11.42
2	BF	43	F	192	-9.5	54	3.84	109	-8.44	0.28	10.76
3	SM	65	F	189	-9.79	70	-8.97	90	3.44	0.37	-9.25
4	DVL	55	M	250	-9.19	54	-9.64	130	-9.42	0.22	10.47
5	DAI	45	M	215	-9.14	44	+10	128	-8.1	0.21	12.35
6	BV	65	F	223	-9.69	53	3.92	154	-9.05	0.24	10.9
7	GS	43	M	248	-9.5	47	4.44	153	-7.72	0.19	11.17
8	VA	51	M	221	-8.98	45	7.14	152	-8.53	0.21	12.35
9	JD	40	M	204	-9.35	43	43.33	108	-8.43	0.21	15
10	DIL	48	M	210	-9.54	46	6.97	121	-8.46	0.22	11

In conclusion, this decrease does not pose a risk to health, on the contrary. The beneficial impact of nutrition is shown by the balanced value of the paraclinical parameters that are specific for the diagnosis of cardiovascular diseases.

### CONCLUSIONS

1. The analysis of the obtained results revealed that atherogenic dyslipidemias have a favourable prognosis correlated with nutrition that is low in saturated fat and trans fat but high in unsaturated fat, especially  $\omega 3$ - and  $\omega 6$ -polyunsaturated fatty acids.
2. Reducing the intake of saturated fats led to a significant decrease of the level of total cholesterol in the blood, but without significant changes in the ratio of lipoproteins, respectively LDL-C to HDL-C.
3. The correlation of the paraclinical parameters with the nutritional value of the foods prescribed in the nutritional plan after a 6-week diet showed a significant improvement in these parameters, ranging around 10-12%, pointing out once again the importance of nutrition assessment.

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