The *Lyon Diet-Heart Study* was a "randomized, single-blind secondary prevention trial aimed at testing whether a Mediterranean-type diet, compared with a prudent Western-type diet, may reduce recurrence after a first myocardial infarction." [1]

The study,

> consisted of 605 patients who had recovered from a myocardial infarction at a hospital in southern France. The experimental group emphasised "more bread, more root vegetables and green vegetables, more fish, less meat (beef, lamb and pork to be replaced with poultry), no day without fruit, and butter and cream to be replaced with margarine" which was high in alpha-linolenic acid (an omega-3 fatty acid).

At the end of the trial, the experimental group had 30% of the cardiac deaths of the control group, despite the fact that the average cholesterol measurements were similar for the two groups.

Source	**Control Diet**		**Experiment Diet**		**Rate change**
	Number	Rate / 100	Number	Rate / 100	%
Cardiac deaths	19	1.37	6	0.41	-68
Non-fatal heart attacks	25	27.0	8	0.83	-68
Non-cardiac deaths	5	0.36	8	0.54	+60
All-cause deaths	**24**	1.74	**14**	0.95	-42
Major secondary endpoints	46	4.96	13	1.35	-42
Minor secondary endpoints	90	9.71	68	7.04	-24
Total endpoints	**180**	18.74	**95**	9.63	-47

Lyon Diet-Heart Study – Comparison of Cardiac Outcomes

However, within the two cohorts, cholesterol did have a significant impact.

> For each increase of 1 mmol/ L of total cholesterol increased the risk of recurrence by 20% to 30%. Epidemiological studies have consistently shown a positive correlation between plasma cholesterol levels and the incidence of (and mortality from) CHD in various populations. Thus, our population does not appear to be different from other low-risk populations. [2]

Given the extent of medication use in both groups, it is difficult (impossible) to determine the true effect of the dietary interventions.

The participants from both groups were overweight at the start of the study with an average weight of 74 kg and BMI of 25.8. At the end of the study, the average weight for both groups had increased by 1-2 kg.

Whilst the reduction in cardiac events is significant and certainly indicates that diet is an important factor, the use of medications should not be required in controlling heart “disease” and heart “disease” should be non-existent in this population. This study does highlight the shortcomings of the Mediterranean diet as defined by the study.

Below is a comparison of biological markers and medication use in the control group compared with the experimental group at the end of the study. Very little change has occurred during the four year period of the study.

Criteria	Units	Control Diet (n=204)	Experiment Diet (n=219)
BMI	kg/(m•m)	26.9	26.3
Systolic blood pressure	mm Hg	128	128
Diastolic blood pressure	mm Hg	79	78
Total cholesterol	mmol/L	6.18	6.20

Criteria	Units	Control Diet (n=204)	Experiment Diet (n=219)
Triglycerides	mmol/L	1.75	1.94
HDL cholesterol	mmol/L	1.28	1.29
LDL cholesterol	mmol/L	4.23	4.17
Lipoprotein (a)	g/L	0.35	0.33
Albumin	g/L	47.10	47.28
Glycated hemoglobin	%	4.61	4.66
Creatinine	µmol/L	116	115
Uric acid	µmol/L	348	338
Leukocyte count	10 ^ 9	6.00	5.99
Current smokers	%	17.9	18.3
Anticoagulant agents	%	16.1	11.4
Antiplatelet agents	%	69.7	75.8
Beta-blocking agents	%	47.3	47.5
Calcium channel blockers	%	28.4	25.6
ACE inhibitors	%	17.4	18.3
Lipid-lowering drugs	%	34.0	26.5

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The use of anticoagulant and lipid-lowering (statins) medications were reduced and anti-platelet medication increased for the experimental group.

- Anticoagulant agents prevent blood from clotting. They perform the same function as

antiplatelet therapy drugs but act in a different manner.
- Antiplatelet therapy drugs are used to decrease platelets from clotting. Platelets are involved in forming blood clots to prevent bleeding.
- Beta-blocking agents reduce blood pressure.
- Calcium channel blockers dilate blood vessels.
- Angiotensin-converting enzyme (ACE) inhibitors are a group of medications that dilate blood vessels. Nitric oxide is produced by the endothelial cells to produce the same effect.
- Statins are used to reduce the levels of cholesterol in the blood.

On the experimental diet, the participants had not only increased their weight but their medication use was essentially unchanged. Whilst anti-coagulant medication use decreased, anti-platelet medication use increased from 69.7% to 75.8%. The study was designed to improve heart health but lipid-lowering drug use was decreased by only 22% in 4 years.

The participants were overweight and unhealthy at the start of the trial and, whilst the experimental group did not do as badly as the control group, 31% were still afflicted with cardiac events during the four-year trial which is not a great result for a condition which is mostly preventable. [3]

Footnotes

1. Kris-Etherton, P. et al. (2001) Lyon Diet Heart Study. *Circulation*. 103 (13), 1823–1825.
2. de Lorgeril, M. et al. (1999) Mediterranean diet, traditional risk factors, and the rate of cardiovascular complications after myocardial infarction: final report of the Lyon Diet Heart Study. *Circulation*. 99 (6), 779–785.
3. *Primary endpoints*: Death and heart attack; *Major secondary endpoints*: Periprocedural infarction, unstable angina, heart failure, stroke, pulmonary embolism, peripheral embolism; *Minor secondary endpoints*: Stable angina, elective myocardial revascularization, post-PTCA restenosis, thrombophlebitis