KAPITEL 2 / *CHAPTER 2* [2]
THE LIFESTYLE HEART TRIAL: THE IMPACT OF INTENSIVE LIFESTYLE CHANGES ON CORONARY ARTERY DISEASE REVERSAL

The Lifestyle Heart Trial was a pioneering study designed to explore whether substantial modifications in lifestyle could result in the reversal of coronary atherosclerosis within a short period, specifically one year. The study aimed to determine if patients with coronary artery disease could be encouraged to make and maintain comprehensive lifestyle changes, and whether these modifications could significantly impact the progression of the disease without the use of lipid-lowering drugs.

The primary objectives of this study were twofold: to assess the feasibility of sustaining intensive lifestyle changes for a total period of five years and to examine the long-term effects of these modifications on coronary artery disease progression, myocardial perfusion, risk factors, and overall cardiovascular health. Unlike other studies that incorporated pharmaceutical interventions, this trial solely focused on lifestyle adjustments as the key intervention.

The study was structured as a randomized controlled trial conducted over six years, from 1986 to 1992, employing a randomized invitational design. This method ensured minimal crossover and reduced potential biases, including ethical concerns and dropout effects. The trial was carried out in two tertiary university medical centers, ensuring a controlled environment for data collection and follow-up.

A total of 48 individuals diagnosed with moderate to severe coronary heart disease were recruited and randomly assigned to either an intensive lifestyle intervention group or a conventional standard-care control group. Among them, 35 completed a comprehensive five-year follow-up that included quantitative coronary arteriography, allowing for precise measurement of disease progression or regression.

The study was implemented in two specialized tertiary care university hospitals

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that provided state-of-the-art facilities for cardiac evaluation, including advanced imaging technologies for assessing arterial health.

Participants in the experimental group underwent a rigorous and structured five-year program that emphasized intensive lifestyle modifications. This program included adherence to a whole-food, plant-based diet with only 10% of calories derived from fats, regular aerobic exercise, stress management training, complete smoking cessation, and participation in group psychosocial support sessions. This holistic approach was aimed at addressing multiple facets of cardiovascular health beyond just dietary changes.

The study systematically tracked and analyzed adherence to lifestyle changes, alterations in the percentage of coronary artery stenosis, changes in cholesterol levels, and the occurrence of major cardiac events. The primary marker for disease progression was the percent diameter stenosis measured via quantitative coronary arteriography.

Results – The experimental group demonstrated a high level of adherence, with 20 out of 28 participants (71%) maintaining intensive lifestyle modifications over the entire five-year period. In contrast, 15 out of 20 control group participants (75%) made only moderate lifestyle adjustments. Over the course of the study, significant differences were observed in coronary artery health:

- In the experimental group, the average percentage of coronary artery stenosis decreased by 1.75 absolute percentage points after one year (a 4.5% relative improvement) and by 3.1 absolute percentage points after five years (a 7.9% relative improvement).

- In contrast, the control group experienced a progressive worsening of their condition, with stenosis increasing by 2.3 percentage points after one year (a 5.4% relative decline) and by a substantial 11.8 percentage points after five years (a 27.7% relative worsening).

- The occurrence of cardiac events was significantly different between the groups. During the five-year follow-up, 25 cardiac events were recorded in the experimental group, compared to 45 in the control group, resulting in a risk ratio

of 2.47 for the control group, indicating a more than doubled risk of adverse cardiac events.

The study provided compelling evidence that the experimental group exhibited greater regression of coronary atherosclerosis after five years compared to their one-year results. Conversely, the control group continued to experience significant disease progression and more than twice the number of major cardiac events, underscoring the effectiveness of comprehensive lifestyle changes in managing coronary artery disease.

The Lifestyle Heart Trial represented a groundbreaking step in cardiovascular research, as it was the first randomized clinical study to examine whether outpatient participants could successfully adopt and maintain rigorous lifestyle changes and whether these changes could halt or reverse coronary atherosclerosis without pharmacological intervention. The foundation of this study was built on earlier research that used non-invasive methods to evaluate cardiovascular health.

Following just one year of adherence to the lifestyle changes, experimental group participants demonstrated remarkable health benefits, including a 37.2% reduction in low-density lipoprotein (LDL) cholesterol levels and an impressive 91% reduction in the frequency of angina episodes. Additionally, their coronary artery stenosis regressed from an initial 40.0% at baseline to 37.8% after one year, with improvements directly correlated to the extent of lifestyle adherence. On the other hand, the control group participants made only moderate lifestyle modifications, leading to a mere 6% reduction in LDL cholesterol levels and a staggering 165% increase in reported angina episodes. Furthermore, their stenosis progressed from 42.7% to 46.1%, indicating a worsening condition.

Encouraged by these promising results, the study was extended for an additional four years to further investigate the feasibility of sustaining long-term intensive lifestyle changes and the continued impact of these modifications on major cardiovascular risk factors, coronary atherosclerosis, myocardial perfusion, and overall cardiac event rates.

To ensure the accuracy and reliability of the study results, a strict protocol was followed for data collection, patient follow-up, and analysis. All participants

underwent an extensive baseline evaluation, including comprehensive medical history documentation, physical examinations, and laboratory assessments. Additionally, they completed a three-day dietary recall and self-reported adherence to exercise and stress management techniques. The control group was instructed to follow conventional recommendations given by their primary care physicians, while the experimental group was guided through the structured lifestyle intervention.

Participants in the experimental group attended regular group meetings where they received dietary guidance, participated in stress reduction techniques, and engaged in peer-support activities. These meetings played a critical role in maintaining long-term adherence and motivation. Each component of the intervention—nutrition, exercise, stress management, and smoking cessation—was monitored and evaluated periodically to track progress.

Adherence to the lifestyle program was a key factor in determining its effectiveness. The experimental group followed a plant-based diet consisting of whole foods, limiting fat intake to 10% of total daily calories. This dietary approach emphasized the consumption of fruits, vegetables, whole grains, and legumes while minimizing processed foods, refined sugars, and animal products. The control group, in contrast, made only moderate dietary modifications, typically reducing fat intake to around 25% of daily calories, consistent with conventional dietary recommendations.

The impact of lifestyle changes on cardiovascular risk factors was systematically assessed. Participants in the experimental group experienced significant weight loss, with an average reduction of 10.9 kg (23.9 lbs) at one year, which was sustained at 5.8 kg (12.8 lbs) after five years. In contrast, the control group exhibited minimal weight changes.

Cholesterol levels also reflected notable differences between the two groups. LDL cholesterol levels decreased by 40% in the experimental group after one year and remained 20% below baseline after five years. In the control group, LDL cholesterol levels declined by only 1.2% after one year and by 19.3% at five years, with over half of the control group participants using lipid-lowering drugs. Notably, no participants

in the experimental group used cholesterol-lowering medications throughout the study.

One of the most significant clinical outcomes was the reduction in angina symptoms. The experimental group reported a 91% decrease in the frequency of angina episodes after one year, which remained at 72% after five years. The control group, by contrast, initially experienced a 186% increase in angina after one year but saw a subsequent 36% decrease after five years, primarily due to revascularization procedures such as coronary angioplasty and bypass surgery.

The primary endpoint of the study—percent diameter stenosis—was evaluated through quantitative coronary arteriography. Results demonstrated that adherence to the lifestyle program correlated strongly with regression of atherosclerosis. The most adherent participants within the experimental group exhibited the most substantial improvements, with percent stenosis decreasing significantly over time. In contrast, disease progression was evident in the control group, with a marked increase in arterial blockage severity.

Furthermore, the frequency of major cardiac events, including myocardial infarctions, hospitalizations, and revascularization procedures, was significantly lower in the experimental group compared to the control group. The data indicated that adopting a comprehensive lifestyle intervention not only halted disease progression but also reduced the likelihood of adverse cardiovascular events over the long term.

The findings of the Lifestyle Heart Trial reinforce the feasibility and effectiveness of intensive lifestyle changes in managing coronary artery disease. Unlike traditional medical approaches that rely heavily on medication and surgical interventions, this study demonstrated that significant health benefits could be archieved through non-pharmacologic methods alone. Importantly, the study highlighted the role of long-term adherence in sustaining cardiovascular improvements, with more favorable outcomes observed among those who closely followed the prescribed interventions.

A key takeaway from the study is that even minor improvements in dietary habits and exercise routines can contribute to better cardiovascular health. However, the most substantial benefits were observed in participants who adhered rigorously to the comprehensive lifestyle program. The dose-response relationship between adherence

and disease regression underscores the importance of patient commitment and ongoing support in achieving optimal outcomes.

These results align with prior research suggesting that lifestyle modifications can positively influence endothelial function, inflammation markers, and lipid profiles. The study also provided evidence that diet-induced reductions in HDL cholesterol levels, often cited as a potential concern with low-fat diets, did not translate to increased cardiovascular risk. Instead, the observed improvements in LDL-to-HDL ratios and overall lipid profiles supported the cardiovascular benefits of a plant-based, low-fat dietary approach.

The Lifestyle Heart Trial provided robust evidence that sustained, intensive lifestyle changes can effectively reduce coronary artery disease progression, improve myocardial perfusion, and significantly lower the risk of cardiac events. Over a five-year period, participants in the experimental group exhibited continued regression of atherosclerosis, while the control group experienced worsening disease progression despite conventional medical management.

These findings have important implications for clinical practice and public health policies. Encouraging comprehensive lifestyle modifications as a first-line approach in managing coronary artery disease has the potential to reduce healthcare costs, minimize dependency on medications, and improve overall quality of life for patients. Future research should continue to explore scalable models for implementing lifestyle-based interventions in broader patient populations.

By demonstrating that coronary artery disease can be managed and even reversed through non-invasive methods, the Lifestyle Heart Trial offers a paradigm shift in cardiovascular treatment strategies. It underscores the power of lifestyle medicine in preventing and managing chronic diseases, paving the way for a more sustainable and patient-centered approach to heart health.