Impact of Diet and Lifestyle on Reversal of Cardiovascular Disease Markers-Diet and Lifestyle Change Primary Influencing Factor Compared to Genetic Predisposition

Abstract
Cardio vascular disease (CVD) has remained the top cause of death across the globe for decades. It is absolutely normal to think that the CVD is genetic. But the research does not support the fact. There is a constellation of data which supports the fact that reduction in parameters like total and LDL cholesterol, weight reduction, sugar levels reduction in case of diabetics, blood pressure reduction in case of hypertensive and increased physical activity helps in prevention as well as treatment of such diseases. It has also been shown that interchanging the nucleus between two cells or removal of nucleus from a cell does not change the metabolism of the cell till it survives which means that the internal environment of the cell is more important than the DNA for its functions. Cultures where people lived for more than a hundred years with no signs of any heart disease now have their children dying at a tender age of 40’s and 50’s which shows clearly that it is not genetic. Change in diet has also shown reversal of the condition in patients suffering from such diseases. In this paper I have shown how changes in the diet and lifestyle in individuals have helped in improving parameters which as stated above can prevent and treat heart diseases, supporting the theory that diet and lifestyle change is primary influencing factor compared to genetics for CVD. Diet and lifestyle changes can reverse the parameters which predispose an individual to CVD.

Keywords: Cardiovascular disease; Cholesterol; Diet; Lifestyle

Introduction
Cardio vascular diseases (CVD) are among the top reasons of death worldwide for a very long time. Research shows that various factors influenced the rates of a person suffering from CVDs. These factors also affected the survival and prognosis of the disease. Some modifiable risk factors include high blood pressure, smoking, diabetes, lack of exercise, obesity, high blood cholesterol, poor diet, and excessive alcohol consumption, among others [1].

Obesity, a fast growing problem worldwide which has reached epidemic levels is a risk factor for 41 adverse health conditions including CVD, heart failure and premature death for individuals including children [2-9]. Owing to the increasing rates of childhood obesity, the global life expectancy in the US will, for the first time in recent history, decline and the American heart association (AHA) has reclassified obesity as a ‘major, modifiable risk factor’ for coronary heart disease (CHD) [10,11]. Individuals with a central deposition of adipose tissue can experience elevated cardiovascular morbidity and mortality, including stroke, congestive heart failure, myocardial infarction and cardiovascular death, and this is independent of the association between obesity and other cardiovascular risk factors [12,13].

Patients with type 2 diabetes are at high risk of coronary heart disease (CHD) [14,15]. Furthermore patients with diabetes who experience a myocardial infarction have a poorer prognosis and a higher CHD mortality rate either immediately or in the long term that non diabetic patients with a prior myocardial infarction [16,17].
Men with higher levels of cholesterol were found to be 3 times more prone to heart diseases compared to those with slightly lower levels. High blood pressure also predisposes an individual to heart diseases [18]. Strong evidence indicates that weight loss in overweight and obese individuals reduces risk factors for diabetes and CVD [19].

Lowering elevated LDL cholesterol levels with statins has demonstrated significant reductions in cardiovascular events in patients with diabetes and CHD [20-23]. Physical activity improves glucose tolerance and sensitivity by improving non-insulin dependent glucose uptake; it improves the ratio between HDL and LDL cholesterol because it increases the activity of lipoprotein lipase; it decreases triacylglycerols, increases fibrinolysis, decreases platelet aggregation, improves oxygen uptake in the heart as well as in peripheral tissues, lowers the resting heart rate by increasing vagal tone, and lowers blood pressure. Physical activity also directly increases myocardial oxygen supply, improving myocardial contraction and electrical stability [24]. Studies have found that even people with advanced heart disease can avoid coronary bypass surgery and angioplasty by following the diet and making the other lifestyle changes [25].

Dr. Dean Ornish’s lifestyle heart trial – A group of patients with advanced heart disease were put on a very low fat plant based whole food diet for a year and asked to stop smoking, take regular moderate exercise and other recreational activities. Meanwhile a control group was treated with a standard American heart association heart disease programme, which includes a significant amount of low fat animal products and utilises cholesterol lowering drugs.

Those patients who completed experimental programme achieved heretofore medically unprecedented improvements in health and vitality. On average their cholesterol dropped from 5.9 mmol/L to 4.5 mmol/L, and their LDL cholesterol dropped even more dramatically – from 4.0 mmol/L to 2.5 mmol/L. Furthermore the frequency, duration and severity of their chest pain plummeted. The more closely the patients adhered to the lifestyle recommendations, the more their hearts healed. Their condition just didn’t deteriorate but got better [26].

Women who ate at least 1 serving of whole grain a day had substantially lower risk of mortality, including mortality from cancer, CVD and other causes compared to those who ate less [27-30].

Japanese men living in Hawaii or California have a much higher blood cholesterol level and incidence of CHD than Japanese men living in Japan. Men living in Japan had the same genetic makeup and also smoking habit was common. Cholesterol increased as their diet changed when they migrated [31,32]. The life expectancy of Okinawans who are known for living really long lives dropped 17 years on average when they migrated [33,34]. The life expectancy changes as per the place they migrate to. With the change in diet and lifestyle the younger okinawans are also falling prey to the lifestyle diseases at young age if 40-50 years though they share the same genes of their healthy centenarian parents [33,34].

In an experiment scientists were able to show that when the nucleus of a normal cell and cancer cell are interchanged, the normal cell remains normal while the cancerous cell remained cancerous [35-37]. In another experiment it was shown that some cells could survive with normal metabolism even when their nucleus was removed altogether although they do not divide further. Enucleated cells are used as feeder cells for industrial production of virus vaccines [38-40].

Some scientists also contest with convincing facts that it is the cytoplasm which actually dictates the differentiation of cells right from the zygote state and the nucleus only helps in the process [41].

The above data shows that CVD depends on various factors which are modifiable by diet and lifestyle. The genetic predisposition or genetic immunity due to ancestral history of long and healthy life plays very little role in case of lifestyle diseases like CVD. The cell metabolism is dependent on the cellular and body environment rather than the genes in the nucleus of the cells. The most compelling and convincing experiment has been the lifestyle heart trial which for the first time successfully showed that even advance heart diseases could be reversed by changes in diet and lifestyle.

Methods

Three individuals coming from different cultural backgrounds having different food habits and lifestyle having high risk of CVD were identified. Factors predisposing them to CVD like weight, sugar levels, cholesterol and blood pressure were monitored before and after they made changes in their diet and lifestyle.

The individuals were put on a high fibre diet. The diet completely eliminated packaged foods, refined carbohydrates, sugars, fruit juices, dairy products, fried foods, refined oils while giving whole grains, whole seeds, nuts, whole pulses, whole legumes and millets. The individuals were asked to perform minimum possible exercise throughout the day every day. They were also advised to take sunbath for a few minutes every day. The progress and health were monitored on a daily basis by personal communication.

Results and Discussion

The markers of CVD like weight, total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, HbA1c (Sugar levels) before the start of the diet and follow up values after a few days were found to be as follows for 3 individual patients with completely different backgrounds (Tables 1-3).

The results show a marked difference in the value of markers over a period of time. All the markers have improved. Total cholesterol reduced from over 200 mg/dl to less than 200 mg/dl which is considered as the safe range. HDL cholesterol considered as the good cholesterol has remained unchanged or even improved (increased) marginally. Similar results can be seen for weight, Sugar (HbA1c) and Triglycerides. The safe range for HDL cholesterol considered as the good cholesterol has remained unchanged or even improved (increased) marginally. Similar results can be seen for weight, Sugar (HbA1c) and Triglycerides. The safe range for HDL cholesterol considered as the good cholesterol has remained unchanged or even improved (increased) marginally. Similar results can be seen for weight, Sugar (HbA1c) and Triglycerides. The safe range for HDL cholesterol considered as the good cholesterol has remained unchanged or even improved (increased) marginally. Similar results can be seen for weight, Sugar (HbA1c) and Triglycerides. The safe range for HDL cholesterol considered as the good cholesterol has remained unchanged or even improved (increased) marginally. Similar results can be seen for weight, Sugar (HbA1c) and Triglycerides.
Table 1 The markers of CVD before the start of the diet and follow up values after a few days in patient 1 (male, 40 years) Ht-6’2”.

<table>
<thead>
<tr>
<th>Markers</th>
<th>Day 1</th>
<th>Day 36</th>
<th>Day 226</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Blood Glucose Fasting (mg/dL)</td>
<td>185</td>
<td>101</td>
<td>97</td>
</tr>
<tr>
<td>2 Total Cholesterol (mg/dL)</td>
<td>200.1</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td>3 HDL (mg/dL)</td>
<td>26.9</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>4 LDL (mg/dL)</td>
<td>128.7</td>
<td>118</td>
<td></td>
</tr>
<tr>
<td>5 Triglycerides (mg/dL)</td>
<td>222.2</td>
<td>146</td>
<td></td>
</tr>
<tr>
<td>6 HbA1c (%)</td>
<td>6.4</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>7 Blood Pressure</td>
<td>180 / 110</td>
<td>140 / 90</td>
<td>120 / 80</td>
</tr>
<tr>
<td>8 Weight (kg)</td>
<td>115</td>
<td>99</td>
<td>95</td>
</tr>
</tbody>
</table>

Table 2 The markers of CVD before the start of the diet and follow up values after a few days in patient 2 (male, 35 years) Ht-5’11”.

<table>
<thead>
<tr>
<th>Markers</th>
<th>Day 1</th>
<th>Day 41</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Total Cholesterol (mg/dL)</td>
<td>221</td>
<td>150</td>
</tr>
<tr>
<td>2 HDL (mg/dL)</td>
<td>40</td>
<td>42</td>
</tr>
<tr>
<td>3 LDL (mg/dL)</td>
<td>164</td>
<td>95</td>
</tr>
<tr>
<td>4 Triglycerides (mg/dL)</td>
<td>91</td>
<td>66</td>
</tr>
<tr>
<td>5 HbA1c (%)</td>
<td>5.2</td>
<td>5.2</td>
</tr>
<tr>
<td>6 Blood Pressure</td>
<td>120 / 80</td>
<td>120 / 80</td>
</tr>
<tr>
<td>7 Weight (kg)</td>
<td>85</td>
<td>76</td>
</tr>
</tbody>
</table>

Table 3 The markers of CVD before the start of the diet and follow up values after a few days in patient 3 (female, 50 years) Ht- 5”.

<table>
<thead>
<tr>
<th>Markers</th>
<th>Day 1</th>
<th>Day 36</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Total Cholesterol (mg/dL)</td>
<td>213</td>
<td>181</td>
</tr>
<tr>
<td>2 HDL (mg/dL)</td>
<td>37</td>
<td>36</td>
</tr>
<tr>
<td>3 LDL (mg/dL)</td>
<td>144.8</td>
<td>114.4</td>
</tr>
<tr>
<td>4 Triglycerides (mg/dL)</td>
<td>156</td>
<td>153</td>
</tr>
<tr>
<td>5 HbA1c (%)</td>
<td>6.2</td>
<td>5.7</td>
</tr>
<tr>
<td>6 Blood Pressure</td>
<td>110 / 70</td>
<td>110 / 70</td>
</tr>
<tr>
<td>7 Weight (kg)</td>
<td>74</td>
<td>68</td>
</tr>
</tbody>
</table>

150 (<150). All the individuals had some family history of heart disease. But the changes in diet and lifestyle markedly improved the marker values improving their chances of preventing CVD.

Conclusion

These results confirm that the markers of CVD can be modified by diet and lifestyle. Keeping in mind these observed changes along with the various research cited in the paper it can be said that diet and lifestyle change is the primary influencing factor compared to genetics for CVD markers, as diet and lifestyle changes the internal environment of the body which primarily dictates the cell metabolism and body health overall.

References

19 Lavie CJ, Milani RV, Ventura HO (2009) Obesity and cardiovascular


