diabetes in the Japanese population. They concluded that hyperhomocysteinaemia in diabetes mellitus may contribute to the development of chronic complications. Vayá et al. established a borderline statistically significant association ($p = 0.008$) between hyperhomocysteinaemia and hyperglycaemia ($p = 0.054$).  

Hypertension is a condition where the artery walls are stiffer and present increased resistance to blood flow. This requires the heart to beat more forcefully and increases the pressure of blood leaving the heart. High blood pressure is often called the silent killer because in the initial stages it presents with no symptoms. It is only after an organ in the body has been irritated or damaged, that the consequences of high blood pressure are realised.  

Hypertension places stress on the target organs, including kidneys, eyes and heart, causing them to deteriorate over time. Hypertension contributes to 75% of all strokes and heart attacks. One in three African-Americans has hypertension. One African-American dies every hour from the disease, and more than 30% of African-Americans can count hypertension or its complications as the leading cause of death.  

The hypothesis that homocysteine may play a role in the pathogenesis of essential hypertension is based on the fact that homocysteine induces arteriolar constriction, renal dysfunction and increased sodium reabsorption, increasing arterial stiffness. Homocysteine increases oxidative stress, which causes oxidative injury to the vascular endothelium, diminishing vasodilation by nitric oxide, stimulating proliferation of vascular smooth muscle cells and altering the elastic properties of the vascular wall, leading to an increase in hypertension. These authors concluded that homocysteine may contribute to blood pressure elevation. Atif et al. observed that plasma homocysteine was raised in most patients with hypertension. The authors found in their study that 80% of their hypertensive subjects were hyperhomocysteinaemic.  

Karatepe and Sainani found a high prevalence of hyperhomocysteinaemia associated with raised blood pressure, with raised systolic and diastolic pressures. Nabipour et al. reported significantly higher homocysteine levels in subjects with high blood pressure. Vayá et al. however found no statistically significant association ($p = 0.008$) between hyperhomocysteinaemia and hypertension ($p = 0.229$). In large community-based studies, plasma homocysteine was found to be cross-sectionally associated with blood pressure, especially systolic pressure, unadjusted for gender and age. The authors however found that adjusted for gender and age, the relationship of plasma homocysteine to the incidence of hypertension was statistically non-significant.  

Experimental investigations evaluating the association of homocysteine and blood pressure have not yielded consistent results. Diet-induced hyperhomocysteinaemia has been demonstrated to elevate blood pressure in some investigations but to lower it in others. A positive association of total homocysteine with both systolic and diastolic blood pressure was reported in several clinical cross-sectional studies. These authors found no major relationship between baseline plasma homocysteine level and incidence of hypertension.  

Lipids are a group of organic compounds that include, among others, cholesterol, triglycerides, phospholipids, lipoprotein and steroids, which are insoluble in water but soluble in non-polar organic solvents. Fats (solid lipids) constitute approximately 34% of the energy used in the human body. Of the lipids, triglycerides and cholesterol [very low-density lipoprotein (LDL), LDL and high-density lipoprotein (HDL) cholesterol] are the components that play a major role in atherosclerosis, the forerunner of arteriosclerosis.  

All body cells are capable of LDL cholesterol (LDL-C) synthesis. This favours deposition of cholesterol in the cells and blood vessels. LDL-C is therefore atherogenic. LDL transports cholesterol from the cells to the liver for degradation into bile salts (sodium taurocholate and deoxycholate). HDL-C is therefore anti-atherogenic and protective against the development of atherothrombosis.  

High triglyceride levels are significant risk factors for cardiovascular disease and are a marker for atherogenic remnant lipoprotein, such as very LDL-C. Even in the presence of tightly controlled LDL-C levels, evidence indicates that high triglyceride levels and low HDL-C levels are independent thrombosis and cardiovascular risk factors. About half of all deaths in developed countries are caused by homocysteinaemia and dyslipidaemia (hypercholesterolaemia and hypertriglyceridaemia).  

According to Rima and Wolfgang, there is an association between hyperhomocysteinaemia and dyslipidaemia, and diabetes mellitus is common to hyperhomocysteinaemia and hypercholesterolaemia. Vayá et al. found no statistically significant association ($p = 0.008$) between hyperhomocysteinaemia and low HDL-C levels ($p = 0.491$) and hypertriglyceridaemia ($p = 0.490$). However, Nabipour et al. found subjects with lower HDL-C levels had higher homocysteine levels ($p = 0.001$).  

Obesity is characterised by excess body fat due to an imbalance between calorie intake and expenditure. Causes of obesity include high calorie intake, lack of exercise and genetic susceptibility or psychiatric illness. Obesity is defined as a body mass index (BMI) greater than 30 kg/m².  

Two patterns of obesity are central (visceral) obesity and peripheral obesity. The former is more common in males and carries a higher risk of coronary heart disease, as well as various forms of metabolic derangement, including dyslipidaemia and impaired glucose tolerance. Peripheral obesity is when fat accumulates in the gluteo-femoral area. It is more common in women but less associated with cardiovascular risk, as a complication of arterial thrombosis. Obesity is an independent risk factor for the complications of atherosclerotic vascular disease, such as myocardial infarction and stroke and has been found to elicit and increase the risk of arterial thrombosis. Obesity affects about 1.3 billion people worldwide, and 3.0 to 20.4% of South African males and 25.9 to 54.3% of females.  

Karatepe and Sainani observed an increased prevalence of hyperhomocysteinaemia in overweight and obese subjects. Nabipour et al. found no significant association between homocysteine level and BMI in a study of the relationship between the metabolic syndrome and homocysteine levels. However, Vayá et al. found in four studies that increased homocysteine levels were related mostly to abdominal obesity.  

Sanlier and Yabanci found increased body weight to be associated with hyperhomocysteinaemia, but without gender differences. El-Sammak et al. also found hyperhomocysteinaemia to increase with age, possibly because of the presence of other factors that raise plasma total homocysteine levels with age, especially increased deterioration in other organ functions.