Methylenetetrahydrofolate reductase gene – environment interaction vis-à-vis cardiovascular variables: A study among Jats of Haryana

ABSTRACT

Genetic and environmental factors trigger the onset of the complex diseases like cardiovascular disease; yet the distinguishing contributing factors are not sufficiently defined. Present study attempted to find out the role of traditional and emerging traditional risk factors for adverse cardiovascular phenotypes like hypertension and metabolic syndrome in light of the role of genetic variation in MTHFR gene (C677T). In the present study, 561 households were surveyed from 15 villages of Palwal district, Haryana, India. Data pertaining to demographic, lifestyle, clinical, anthropometric, physiological and biochemical parameters were collected from a total of 1387 individuals recruited in the present study. Hypertension was the largest phenotype observed, followed by prehypertension and metabolic syndrome. Prevalence of CVDs such as CAD, stroke and T2DM were found in a very low frequency. Males had higher prevalence of lipid, hyperhomocysteimia, and nutritional deficiencies (folate and vitamin B12) and are hence at a greater risk for hypertension and CVDs as also shown by higher prevalence (>10%) of 10 yr CVD risk score in them than the females. Females are more predisposed to cardiometabolic abnormalities as depicted by higher prevalence of both traditional (BMI, WC and WHR) and emerging non-traditional (Body fat%, and fat mass) obesity parameters in them. MTHFR 677T allele was found in similar frequencies in both males (15%) and females (16%) and is not found to be associated with any of the adverse cardiovascular phenotypes. MTHFR C677T interaction with environmental factors showed that MTHFR C677T may not be directly associated with cardiovascular adversities. The cause of hyperhomocysteinemia in this population was nutritional deficiencies such as vitamin B12 and folate and MTHFR C677T interaction with these nutritional deficiencies. It seems that Haryana is still straddling somewhere in the first stage of epidemiological transition. However, high prevalence of traditional risk factors and emerging non traditional risk factors along with metabolic syndrome and the interaction of MTHFR C677T with them; thereby increasing the cardiometabolic risk (also evident from 10yr future CVD risk score), infers that this group is heading towards the third stage of epidemiological transition likely to enter the this stage in near future. Therefore, understanding the prevalence of CVD associated risk factors and identifying the role of emerging non traditional risk factors along with the genetic makeup of such population groups who are likely to undergo epidemiological transition urge the need of formulation of interventional strategies that may be useful in combating the forthcoming adversities.