Attention-deficit hyperactivity disorder (ADHD) is one of the most common neurobehavioral disorder affecting growing children. Clinically, the child may present with varying symptoms of hyperactivity, impulsivity, and/or inattention. Individuals diagnosed with ADHD often exhibit a number of co-morbid conditions complicating the clinical picture. Molecular genetic findings on ADHD mainly rely on associations with candidate genes; associations between ADHD and genetic polymorphisms in the catecholamine receptors, transporters and metabolizing enzymes have been reported in different ethnic groups. As it is a complex disorder, combined effect of gene variants is also hypothesized to be an important aspect to study in the disease etiology. The present study was aimed at investigating association of thirteen polymorphic sites in six genes, \textit{DRD2} (rs1799732 & rs6276), \textit{DRD4} (rs4646984 & rs4646983), \textit{SLC6A3} (rs40184 & rs2652511), \textit{SLC6A2} (rs3785143 & rs11568324), \textit{COMT} (rs740603, rs165599, rs4680 & rs362204) and \textit{DBH} (rs1611114 & 19bp ins/del), with ADHD as well as its co-morbid conditions in the eastern Indian population. Nuclear families with ADHD probands (N=190) and ethnically matched controls (N=160) were recruited based on the DSM-IV criteria after obtaining informed written consent for participation. Genomic DNA was analyzed by PCR-based methods for genotyping. Data obtained were examined for population as well as family-based association analyses. rs1611114 was monomorphic in the studied population and excluded from further statistical analysis. Case-control analysis revealed higher occurrence of rs1799732 ‘C’, rs4646984 ‘1R’ , rs4646983 ‘1R’, rs40184 ‘G’, rs165599 ‘G’ and rs740603 ‘G’ alleles in ADHD probands and those with associated co-morbid conditions. Family-based analyses revealed preferential transmission of rs6276 ‘A’, rs3785143 ‘C’, rs11568324 ‘C’ and rs740603 ‘G’ from parents to ADHD probands. Gene-gene interaction analysis revealed significant independent main effects of rs1799732, rs6276, rs2652511 and rs3785143. Epistatic interactions between the studied markers were also observed. It can be concluded from the data obtained that the studied \textit{DRD2}, \textit{DRD4}, \textit{SLC6A3}, \textit{SLC6A2} & \textit{COMT} sites may have some role in the aetiology of ADHD, especially the co-morbid conditions, in this ethnic group.