Genetic Predisposition of Preeclampsia among Asian Population

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Preeclampsia, characterized by new-onset hypertension after the 20th week of gestation, is linked to genetic factors associated with hypertension. Research has confirmed a genetic contribution to its susceptibility, although the exact pathogenesis unclear. Since, Asian populations have been understudied in this regard, this systematic review aimed to analyze data from 4608 pregnant women across six articles out of 15808 initial articles published on CINAHL, Google Scholar, and PubMed databases from 2014 to 2024. The review highlighted a varied genetic susceptibility landscape to preeclampsia among Asian populations. Three Chinese cohort studies highlight correlations between genetics and preeclampsia. One study reveals elevated renalase levels and specific renalase polymorphisms (rs10887800, rs2576178), indicating heightened susceptibility to long-term preeclampsia. Another study identifies seven alleles, including genes like AGT, IL-10, TNFα, NOS3, APOE, and ERAP2, significantly associated with preeclampsia in the Han Chinese population. The third study links CRP haplotypes and the rs2794521 genotype to preeclampsia risk in Han Chinese, with certain haplotypes showing either susceptibility or protective effects. In a Sri Lankan study IL1A and MBL1 polymorphisms are associated with heightened preeclampsia risk, while MBL1 rs1800450 demonstrates reduced prevalence in preeclampsia cases. Genotyping analysis in a Pakistani population revealed that the MTHFR:c.665C > T variant is associated with increased susceptibility to preeclampsia (OR = 2.79, 95% CI = 1.18–6.59; P* = 0.046 in over dominant model, OR = 2.91, 95% CI = 1.29–6.57; P* = 0.0497 in dominant model). However, the F5:c.1601G > A, VEGFA: c.-2055A > C, and VEGFA: c.*237C > T variants showed no relationship with the disease. Moreover, the IL-4 VNTR polymorphism confers a higher risk of preeclampsia in the Iranian population. In conclusion, correlations between specific genetic variants and preeclampsia risk, such as elevated renalase levels and polymorphisms, and CRP variants, underscore the significant role of genetic factors in the development and susceptibility to preeclampsia, emphasizing the need for further investigation in this area.

Keywords: Preeclampsia, Genetic Predisposition, Polymorphisms, Asian Population