

## ABSTRACT

Glaucoma is an irreversible visual impairment disorder caused by elevation of IOP, apoptotic death of the retinal Ganglionic cells, excavation of optic nerve and ultimately vision loss if remained untreated. It's a polygenic trait and multifactorial disease affecting more than 70 million people throughout the world after the age of 40 years. The present study was aimed to identify the genetic polymorphism in *OPTN* gene and its association with glaucoma. Three SNPs (rs11258194, rs75654767, rs2234968) of *OPTN* gene were evaluated with their restriction enzymes *StuI*, *AccI* and *HpyChIV* respectively for their genetic association with glaucoma. For this purpose, blood samples were carried out from 100 patients and 100 controls with their clinical characteristics. According to the WHO criteria all the patients were clinically diagnosed with glaucoma and they were assessed for clinical parameters. Genomic DNA was isolated from blood. Genotyping was done by PCR which was followed by DNA sequencing and PCR-RFLP. The older people (50-60 years) were at high risk of disease development as compared to the healthy individuals whereas, family history was a strong predictor of glaucoma. Overall the genotypic frequencies of two SNPs rs11258194 "TA" (0.21) and rs75654767 "AA" (0.42) were higher in patients as compared to controls (0.00) and were significantly associated ( $p < 0.05$ ) with Glaucoma in Pakistani population. It was estimated that the rs2234968 polymorphism was not significantly associated with development of glaucoma in Pakistan. Haplotype analysis indicated that the frequency of TGG, AAG, and TAG was higher in patients as compared to the controls and strongly associated ( $p < 0.05$ ) with the disease onset while the haplotype AGG was significant in controls and have a protective role against disease development. Moreover, no linkage disequilibrium was seen between the rs2234968 and rs2234968 except the rs11258194 ( $D' = 0.75$ ). The polymorphism in *OPTN* was significantly associated with the glaucoma. A large scale genetic screening is required to build a set of genetic markers that can be used for genetic testing for early diagnosis and prevention.