The influence of type-2 diabetes on cataract and their shared genetic basis through relevant genome-wide association studies

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Cataract in type-2 diabetes (T2D) patients is a secondary complication and one of the leading causes of vision loss next to diabetic retinopathy. Various factors such as age, gender, diabetes duration, HbA1c, BMI and genetics contribute towards cataractogenesis. The genetic predisposition of patients with T2D to develop cataract remains unanswered. It is important to examine the underlying genetic etiology of cataract in T2D through large-scale genetic studies. Since there have been only a handful of genome-wide association studies (GWAS) on T2D-influenced cataract, multiple studies from various ethnicities are warranted to substantiate if T2D truly influences the development of cataract. This study provides an overview of possible mechanisms and factors that trigger the development of cataract in T2D patients, relevant GWAS and the role of genes associated with T2D-associated cataract.

Keywords: Aldose reductase, diabetic cataract, genome-wide association studies, polygenic risk score, sorbitol dehydrogenase.

huge burden on the healthcare systems[6]. Cataract affects approximately 94 million people around the world, according to a report by the World Health Organization. Cataract is also responsible for 66.2% of blindness in India[7].

There are three types of age-related cataract based on where and how they develop. Nuclear cataract involves the central region of the lens and is the most common type of cataract. Cortical cataracts are developed due to opacification of the lens in the outer layer[8]. Posterior cataracts develop at the posterior part of the lens and are the most common in diabetic patients[9]. Based on age, cataract is classified as congenital and age-related. Congenital cataract develops at an earlier stage of birth, whereas age-related cataract develops much later due to various reasons such as smoking, hypertension, prolonged use of steroids and prolonged diabetes[10].

Diabetic cataract is a polygenic disorder contributed due to a complex interplay of genetic and environmental factors[11]. Diabetic cataract is a secondary complication of T2D leading to visual impairment[12]. It is important to note that T2D only increases the risk