

Synergistic effect of diabetic type II with risk factors on the incidence of cataract eyes lens and opacity

Salah Abd- Al kader Omran^{*1}, Riyadh Kadhim Mohammed²

Abstract

We conducted a scientific study for one year at the Specialized Center for Diabetes (Iraq - Samawa) on the rate of increase of white cataract (eye water). Patients were 280 diabetic / type II of aged ≥ 40 years with reduce the development of disease and collected randomly, included women and men. The files of patients were reviewed and the nature of the process the disease of high risk of obesity, high blood pressure, heart disease, high urea, creatinine, and COPD, were involved in this scientific study for a full year at the specialized center for diabetes (Iraq-samawa). Patients were divided to four groups (4 codes); the first is the patient pre - diabetes (30) patient and the second were diabetic (130) patient and the third chronic diabetes (98) patient and the fourth (22) patient under control there is no diabetes. Work was accomplished by the help of the ophthalmologist in diagnosis, transfer and follow-up before injury cataract and after injury cataract and necessary surgery for the two patients We have the main goal of preparing the patient for follow-up and medical treatment by controlling blood sugar and the various risk factors that threaten the life of the patient and during the work). The medications; Metaformin, Daonil, Amyral, Novenorm, Statin, Aspirin, Saxaglapatin were used in this study. All precautions to maintain the health of the patients and improve the living, also reducing the rate of diabetes and cataracts eye clearly and according to the census. The age after 65 years were the most vulnerable to cataracts and females (9 -16%) are more likely than men (6% - 11%) to have cataracts, as conclusion; the irregular diabetes is a risk factor of cataracts with the cooperation of other factors like age.

Keywords: Diabetes Mellitus type/2; Cataract; Risk factor; Patient; Drug

* Correspondence author: drsalahomran@yahoo.com

¹College of Medicine, University of Al Muthanna

²Director of Diabetes Specialized Center in Samawa

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Introduction

The diabetes mellitus (DM) is a clinical syndrome characterized by hyperglycemia due to absolute or relative deficiency of insulin. This can arise in many ways [1], the most commonly due to autoimmune type 1 diabetes or to adult-onset type 2 diabetes. Lack of insulin affects the metabolism of carbohydrate, protein and fat, and can cause a significant disturbance of water and electrolyte homeostasis. Death may result from acute metabolic decomposition, while long-standing metabolic derangement is frequently associated with functional and structural changes in the cells of the body, with those of the vascular system being particularly susceptible. These changes lead to the development of clinical 'complications' of diabetes which characteristically affect the eye (cataract, retinopathy), the kidney and the nervous system. In patients with type 2 diabetes excessive production of glucose in the liver and under-utilization of glucose in skeletal muscle result from resistance to the action of insulin. A characteristic feature of type 2 diabetes is that it is often associated with other medical disorders, particularly central (visceral) obesity, hypertension and dyslipidemia (characterized by elevated levels of small dense LDL cholesterol and triglycerides, and a low level of HDL cholesterol). It has been suggested that coexistence of this cluster of conditions, all of which predispose to cardiovascular disease, is a specific entity (the 'insulin resistance syndrome' or 'metabolic syndrome'), with a predisposition to insulin resistance being the primary defect and the presence of obesity being a powerful amplifier of the insulin resistance. The primary cause of insulin resistance remains unclear, but this is a major focus of current research. Factors include pancreatic β -cell failure and Genetic predisposition and Environmental factors. Age, Pregnancy, Metabolic disturbances in type 2 diabetes [2]. Due to chronic complications of (DM) affect many organ systems and are responsible for the majority of morbidity and mortality associated with the disease. Chronic complications can be divided into vascular and nonvascular complications. The vascular complications of DM are further subdivided into microvascular (retinopathy, neuropathy, and nephropathy) and macrovascular complications [coronary artery disease (CAD), peripheral arterial disease (PAD), cerebrovascular disease]. Nonvascular complications include problems such as gastroparesis, infections, and skin changes. Long-standing diabetes may be associated with hearing loss. Whether type 2 DM in elderly individuals is associated with impaired mental

function is not clear. Glaucoma, Cataract clinical trial randomized advanced age is a significant risk factor for the development of cataracts. A family history for early development of cataracts, the presence of diabetes, tobacco use, and prolonged exposure to sunlight are also risk factors, as is trauma to the eye [4]. A cataract is any opacity within the lens [3, 4, 5]. Cataracts are classified: According to their morphology and position within the lens and graded by the degree of opacity or 'maturity' produced. If lens damage is insufficient to progress to maturity a localized opacity is produced in the injured region that becomes surrounded by new lens fibers as they are laid down beneath the capsule. The three major types of age-related cataract are nuclear, cortical and posterior subcapsular opacity; many patients have combinations of these [8, 9, 11]. Figure 1, 2, 3.

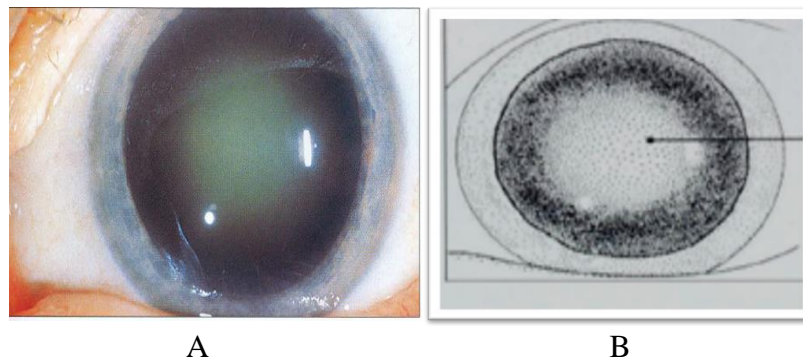


Figure 1.

A: The common age- related nuclear cataract as picture
B: The common age- related nuclear cataract as diagram.

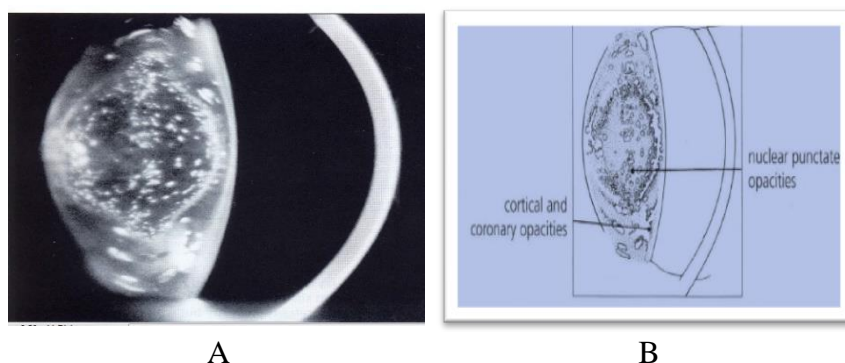


Figure 2.

A: Cortical and coronary opacities as picture.
B: Cortical and coronary opacities as picture as diagram.

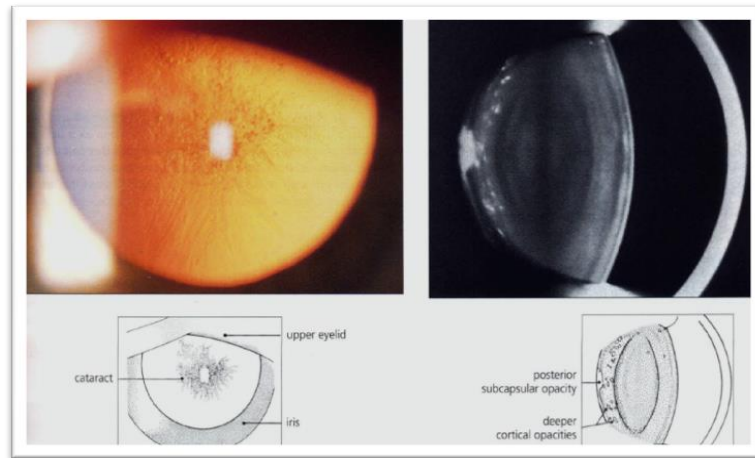


Figure 3.
Posterior subcapsular opacity

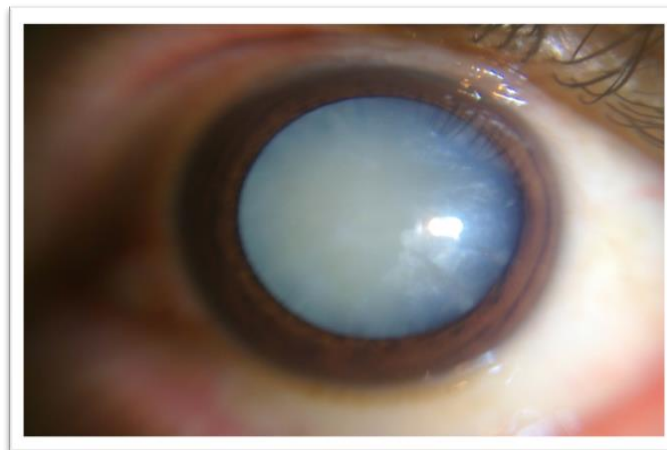


Figure 4.
Posterior subcapsular opacity

The aim of this study was to assess incidence rates of cataract (diagnosis or extraction, subsequently named “diagnosis” throughout the manuscript) in patients newly diagnosed with diabetes and treated medically (aged ≥ 40 years or older at the time of the first diabetes diagnosis), and to compare them with individuals without diabetes from the general population. Furthermore, we aimed to quantify comorbid conditions, as well as prior diabetes medication use in diabetic patients with cataract, and we explored the association between diabetes duration, diabetic control, and cataract diagnosis risk.

Materials and methods

In collaboration with the ophthalmologist, the collection of patient files and the review of (280) patients with hysterical randomized image under work and actual work with patients over a full year during the time period from 1st January 2017 to 31st December 2017. We have focused on the research on the T2DM of the ≥ 40 years. The main cause of blindness in our society is our important topic of Cataract so the evaluation was from During tests and control and during the diagnosis of risk factor With control body mass index(BMI), age, sex, weight, obesity, smoking, stress and cardiovascular diseases, The work section is as follows: (code 4): Subgroup (code 1) 30 patient which carries the onset of pre-diabetes (code 2) 130 patients treated with T2DM (code 3) 98 patient chronic diabetes with the risk factor (code 4) (22) Patients not treated with diabetes were placed under control and followed up lifestyle and During the work we took all the necessary precautions to work and maintain the health of the patient, with caution of the aggravation of the risk factors calculated in each subgroup in addition to the development of diabetes, which concerns us, which leads to cataract eye or affected the retina (Retinopathy) in addition to the examination by the eye ophthalmologist periodic evolution of the disease has been divided stages Surgical also (a, b, c) also comes as [12,13,14].

The first calculated incidence rates (IRs) of cataract defined as (a) cataract diagnosis recorded (b) cataract surgery and (c) cataract surgery only in patients with a first-time diagnosis of diabetes mellitus, compared to matched diabetes-free controls. We also assessed IRs in subgroups of diabetes patients with a diagnosis of macular edema or retinopathy at any time in their patient records. In addition, case-control analysis and According to the Protocol drug treatment Which have been used for various T2DM cases Metaformin, Daonil, Amyral, Novenorm, Statin. We found that risk factors play an important role in the development of diabetes, which leads to side effects, including cataract and patients who are not treated with diabetes. The risk factors surrounding them have an important effect in the initial diagnosis and have a lower patients who only surgery for them without delay immediate treatment for them we support through our research periodic follow-up and the dimensions of risk factors in various therapeutic ways to preserve the lives and the dimensions of the risk of blindness from the patient, especially patients who have a history of

diabetes patients and patients who have complications and side risk factors even without diabetes treatment should observe the act Risk factors, and slower rate of diabetic patients control analysis among patients with diabetes And patients without diabetes and through follow up analysis. They have all undergone an investigation F.B.S, HbA1C, R.F.T, Lipid profile, albuminuria, C.B.C, Therefore, the ratio was a clear increase melody for diabetes patients generally chronic, especially diabetes with surrounding patient cataract patients risk factors of the surgical and a willingness to be cataract for diabetes patients who predisposed surgery

Results and Discussion

Associated potential risk factors for a cataract diagnosis. We excluded individuals with a diagnosis at any time in the record of congenital cataract, cancer, melanoma skin cancer, HIV, or alcoholism, patients with a diagnosis of glaucoma, glaucoma surgery, one or more prescriptions for drugs to treat glaucoma.

During the period of the study, we conducted periodic analyzes of the patients, according to each case and according to the protocol in force in the hospital every month and part of them every three months to know the progress of diabetes and the risk factors affected by it (HbA1c, F.B.S, lipid profile, R.F.T, macroalbuminuria, C.BC [16, 17, 21].

Table 1.

Laboratory analysis

Patient	Grade	HbA1c	Lipid profile	R.F.T	Proteinuria	Average%
Prediabetic	1	≤ 6 – 7	>Trig	NO	NO	0.02.%
Diabetic	2	> 7 – 9	>Trig >CH	> CRUI	No	11.3%
Chronic (DM)	3	> 8 - 10	>LDL > CHOL	> URUI	Few	19.2%
NO (DM)	4	< 6	>TRIG	NO	No	1.0%
Risk factor	-	YES	YES	YES	Yes	22%

Our study has several limitations. Because cataract is developing slowly over a period, the date of the initial recording of cataract (or cataract surgery), i.e., the index date, does not equal the actual cataract onset. Therefore, assessing the association of cataract with previous exposure to diabetes medication or with diabetes duration up to the index date remains somewhat arbitrary. Furthermore, we were not in the position to differentiate between the three types of cataract, as the diagnosis codes

most often used by the GPs were general cataract codes. In addition, diabetic patients receive regular eye checks from the hospital eye service whereas in the general population, detection of early cataracts with no impact on vision may not necessarily be fed back to the GP by the optometrist if mild and not requiring intervention. Thus, there may be a slight 'over-reporting' in the diabetes subgroup compared to the general population who are not having regular eye checks. Within a predefined time frame around the diabetes diagnosis [19, 20, 22]. Our incidence rates may therefore rather reflect detection rates as this was an observational study and no intervention study. In addition, we did not perform a case validation on cataract diagnosis cases for this study; however, a recent validation study doctor [20], of cataract codes in the chart found a positive predictive value for the cataract code of 22.3%. To increase the likelihood of studying true diabetes patients, we only included diabetic patients who received medical treatment, our study has several strengths. The data source is a well-established primary care database of high quality and completeness. The information on drug exposure and diagnoses was recorded prospectively and independent of a study hypothesis, thereby recall bias could not have influenced our results. Furthermore, by excluding all patients with <40 years of recorded history in the database prior to the first-time diagnosis of diabetes, we minimized the risk of including prevalent diabetes cases. We were able to incorporate many potential confounders in our analysis, such as BMI, smoking, a range of comorbid conditions and prescriptions for treatment drugs.

Incidence rate ratios are displayed in Tables 3 and 4. The incidence rates (IRs) of cataract increased considerably around the age of over 65 years until very advanced age, with the highest IRs in the age category over 65 years. Diabetics, however was low in patients of the age group of 40–55 years. Incidence rates per year of cataract diagnosis did not vary much during the study period. The incidence rate of cataract diagnosis in diabetes patients with a diagnosis of macular edema recorded at any time in their patient records was considerably higher than in the general diabetic population (40-60 yr, 4% and between over 65 yr. 22%). The incidence rate of mixed cataract diagnosis in diabetes patients with retinopathy appeared to be only slightly higher than in the overall diabetic population (40-55yr, 1,02% as for over 65 yr, 60%).). Mixed cataracts were more common than monotype ones the prevalence of

cataract was higher in women, subjects with known diabetes and those with longer duration of diabetes, the risk factors for any type of cataract were increasing age and increasing glycosylated hemoglobin was the protective factor. The risk factors for nuclear cataract included increasing age (odds ratios OR, 1.15) and high serum triglycerides (OR, 6.83). For cortical cataract, increasing age (OR, 1.14) and poor glycemic control (OR, 2.43) were the risk factors; increasing hemoglobin (OR, 0.41) was the protective factor. For posterior subcapsular cataract, the risk factors included increasing age (OR, 1.11), being of the female sex (OR, 9.12), employment (OR, 9.80), and duration of diabetes (OR, 21.37), The end result must control the risk factors and diabetes have a significant role in reducing the eye cataracts and side effects and give a positive result by arriving at the research. See tables 1,2, 3 and 4. See charts 1 and 2.

Table 2.

Natural limits of diabetes

Type of Diabetes	Normal glucose tolerance	Hyperglycemia		
		Pre-diabetes		Diabetes Mellitus
		Impaired fasting glucose or impaired glucose tolerance	Not insulin requiring	Insulin required for control Insulin required for survival
Type 1				
Type 2				
Other specific types				
Gestational Diabetes				
Time (years)				
FPG	<5.6 mmol/L (100 mg/dL)	5.6–6.9 mmol/L (100–125 mg/dL)	≥7.0 mmol/L (126 mg/dL)	
2-h PG	<7.8 mmol/L (140 mg/dL)	7.8–11.1 mmol/L (140–199 mg/dL)	≥11.1 mmol/L (200 mg/dL)	

Table 3.

Patient with diabetes by code cataract

Patient	Number	Grade	One year	Cataract eye injury	General average
ALL	280 patients	1, 2, 3, 4	yes	Yes	22.3 %
Pre-diabetes	30 pt.	1	Yes	No	0 – 1%
Diabetes	130 pt.	2	Yes	Yes	6 %
Chronic diabetes	98 pt.	3	Yes	Yes	22.1 %
Under control	22 pt.	4	Yes	No	0%

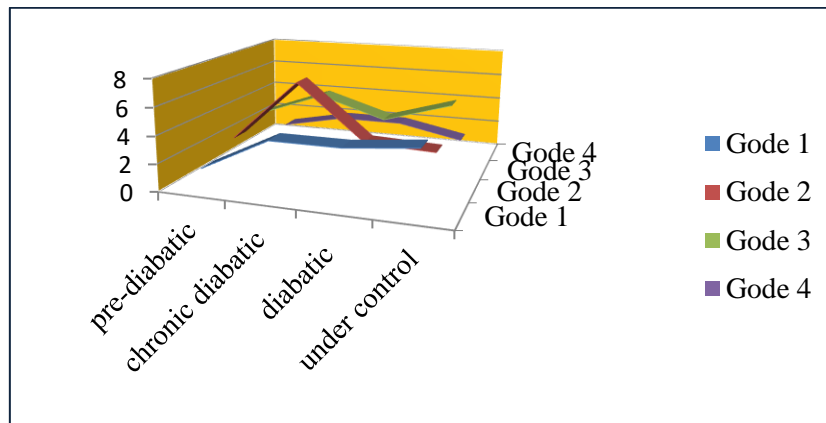


Chart 1.
 Statistical analysis Cataract

Tablet 4.
 Calculate all patients by age and degree of cataract

All Patient for Age	Number	One year	Cataract eye injury	Risk Factor	Blindness
Age (40-50)	78	yes	0 - 1%	Yes	NO
Age (50-60)	138	yes	0.4 – 5 %	Yes	NO
Age over 65	64	Yes	12 – 22%	Yes	NO
Man	152	Yes	6 -11%	Yes	NO
Woman	128	yes	9 – 16 %	Yes	NO

Table 5.
 Incidence rates of cataract diagnoses and surgery cases

Patient	Grade	Diagnoses	Pre-operation	Operation	%
Pre-diabetic	1	No cataract	No	No	0 - 001%
Dibatic	2	Few cataract	cataract	Cataract	6 - 9%
Chronic diabetic	3	cataract	cataract	Cataract	11 - 22%
No diabetic	4	No	No	No	No
Risk-factor	--	Yes	Yes	Yes	Yes

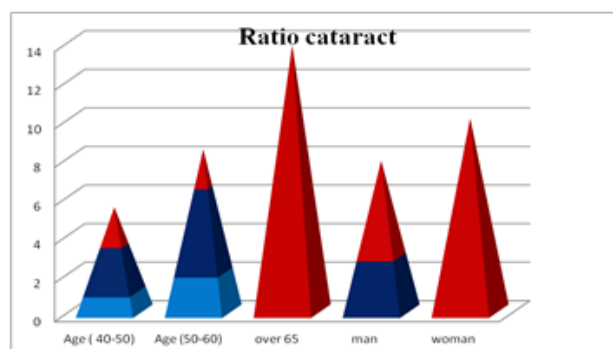


Chart 2.
 Calculation of the cataract relative to age.

Conclusion

This large observational study demonstrates that incidence rates of cataract diagnosis in patients with diabetes T2DM are higher than among diabetic-free patients, particularly at medium age. The overall approximately twofold increased risk of cataract diagnosis associated with diabetes increases with diabetes duration. Patients with diabetic macular edema are at an increased risk for a cataract diagnosis. Academic study and continuous work in the center of Diabetes to reduce eye cataract and in collaboration with a doctor Ophthalmology all types of patients with diabetes type II, separate 280 patients, women and men randomly mixed age ≥ 40 year were divided into 4 code and were exposed to risk factors and we used drugs for diabetes, hypertension and heart disease to treat patients to control diabetes and the removal of diseases of pressure and heart and the removal of factors the risk and comparison of control of diabetes, cataract acquisition of the surgical word and the most common age of cataract after 65 years and women more than men, guidance and education have an important role in reducing eye cataract. FPG = fasting plasma Glucose 2-h PG = After 2 hours plasma Glucose.

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