

ORIGINAL RESEARCH

**THE IMPACT OF METFORMIN TREATMENT IN GLAUCOMA OF DIABETIC PATIENTS****Hadeel Hafez El-Zayyat<sup>1</sup>, Hayat Yasser Hilan<sup>1</sup>, WalaaShaher Arabiat<sup>1</sup>, Maha Ahmed Abu Suhyouun<sup>1</sup>, Diana Bloukh<sup>1</sup>, Muyyed Abd Alrhman Maqbeh<sup>1</sup>, Jaafar Abu Abeeleh<sup>1</sup>, Ahed J Alkhatib<sup>2,3\*</sup>**<sup>1</sup>Royal Medical Services, Jordan<sup>2</sup>Department of legal medicine, Toxicology of Forensic Science and Toxicology, School of Medicine, Jordan University of Science and Technology, Jordan<sup>3</sup>Council for Nutritional and Environmental Medicine, Mo i Rana, Norway

Submitted on: 28.05.17;

Revised on: 07.06.17;

Accepted on: 10.06.17

**ABSTRACT:****Introduction:** Glaucoma is associated with diabetes. Metformin is one of the first therapeutic options for diabetes and may act to overcome the incidence or severity of glaucoma.**Study objectives:** Tto study the prevalence of glaucoma in Jordanian diabetic patients and to investigate the association of glaucoma and metformin treatment in diabetic Jordanian patients.**Methods and subjects:** Aretrospective study was conducted to collect data from files of diabetic patients who attended internal medicine clinics at Royal Medical City. Files were eligible if the status of glaucoma was available and if the treatment with metformin was indicated. Dataincluded demographic variables such as age and gender; and medical conditions such as diabetes, glaucoma, and metformin treatment. Data was analyzed using SPSS version 20. Data was presented as frequencies, percentages, means and standard deviation. The relationship between variables was investigated using Chi-Square, and One way Anova. Significance was considered at  $\alpha \leq 0.05$ . Study findings showed that the prevalence of glaucoma was 50% among diabetic patients. Study findings showed that the prevalence of glaucoma was 50% among diabetic persons. Glaucoma was not associated significantly with metformin use, gender, age, metformin use, or metformin dose. Taken together, the present study showed that the glaucoma is not associated significantly with study variables included in the study.**Keywords:** Glaucoma, Metformin, Diabetes.**Corresponding Author: Jaafar Abu Abeeleh**  
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Journal Home Page: <https://www.irjps.in>  
DOI: 10.21276/irjps.2017.4.2.10

**INTRODUCTION:**

Glaucoma is considered as an important reason that is characterized by being irreversible cause for blindness worldwide<sup>1-2</sup>. There are several types of glaucoma, but the most prevalent type is called primary open angle glaucoma (POAG)<sup>3</sup>. The occurrence of glaucoma has been associated with several risk factors including older age, family history, myopia, and ocular hypertension<sup>4-6</sup>.

Diabetes mellitus (DM) is considered as real health problem with increasing prevalence globally because of changed trends in lifestyles and increased age of population. Furthermore, several complications are associated with DM such as severe acute and chronic complications<sup>2, 5</sup>. DM is widely prevalent and its prevalence increased from 2.8% in 2000 to 4.4% in 2030 among all age groups at global level<sup>7</sup>.

The relationship between DM and glaucoma was investigated through several studies; some studies reported significant relationship<sup>8-9</sup>. Other studies did not report a significant relationship between DM and glaucoma<sup>10-11</sup>.

The relationship between the treatment of metformin and glaucoma was investigated. Lin et al<sup>12</sup> conducted a study in which 150 016 patients with diabetes mellitus were included. A total of 5893 (3.9%) developed glaucoma. They also found that patients who were prescribed the highest level of metformin (>1110 g in 2 years) to have one quarter reduction rate in developing OAG. They also found that the use of 1 gram of metformin was able to decrease the risk of developing OAG by 0.16%.

**STUDY OBJECTIVES:** to study the prevalence of glaucoma in Jordanian diabetic patients and to investigate the association of glaucoma and metformin treatment in diabetic Jordanian patients.

**METHODS AND SUBJECTS:**

**Study design:** a retrospective study was conducted to collect data from files of diabetic patients who attended internal medicine clinics at Royal Medical City.

Files were eligible if the status of glaucoma is available and if the treatment with metformin is indicated. The data included demographic variables including age and gender; and medical conditions such as diabetes, glaucoma, and metformin treatment. Data will be entered into excel sheet and will be further analyzed using SPSS version 20. Data were presented as frequencies, percentages, means and standard deviation. The relationship between variables was investigated using Chi-Square, and One way Anova. Significance was considered at  $\alpha \leq 0.05$ .

**RESULTS:**

As indicated in table 1, the mean age of participants was 56.95+ 11.98 years; 53.2% of participants were males; the majority of participants were prescribed for metformin therapy; the mean metformin dose was 1069.52+ 954.86 mg; and the prevalence of glaucoma was 50%.

**Table 1: General characteristics of participants**

Variable	Description
Age (M+SD years)	56.95+ 11.98
Gender (N, %):	
- Males	33 (53.2%)
- Females	29 (46.8%)
Metformin use (N, %):	
- Yes	41 (66.1%)
- No	21 (33.9%)
Metformin dose (M+SD mg)	1069.52+ 954.86
Glaucoma (N, %):	
- Yes	31 (50%)
- No	31 (50%)

As shown in table 2, the prevalence of glaucoma was not significantly associated with metformin use

( $p=0.183$ ), and gender ( $p=0.799$ ).

**Table 2: The relationship between glaucoma and study variables**

Variable	Glaucoma				P value
	Yes		No		
	N	%	N	%	
<b>Metformin</b>					<b>0.183</b>
- Yes	23	74.2	18	58.1	
- No	8	25.8	13	43.9	
<b>Gender</b>					<b>0.799</b>
- Males	17	54.8	16	51.6	
- Females	14	45.2	15	48.4	

The data presented in table 3 demonstrated that the prevalence of glaucoma was not predicted by study variables including age ( $p=0.242$ ), gender ( $p=0.803$ ),

metformin use ( $p=0.185$ ), and metformin dose ( $p=0.616$ ).

**Table 3: predictors of glaucoma**

Variable		Sum of Squares	df	Mean Square	F	P value
Age	Between Groups	198.726	1	198.726	1.395	0.242
	Within Groups	8550.129	60	142.502		
	Total	8748.855	61			
Gender	Between Groups	.016	1	.016	.063	0.803
	Within Groups	15.419	60	.257		
	Total	15.435	61			
Metformin	Between Groups	.403	1	.403	1.794	0.185
	Within Groups	13.484	60	.225		
	Total	13.887	61			
Metformin dose	Between Groups	234130.645	1	234130.64	.254	0.616
	Within Groups	55383354.839	60	923055.91		
	Total	55617485.4	61			

**DISCUSSION:**

We conducted this study to achieve two objectives, the prevalence of glaucoma in Jordanian diabetic patients and to investigate the association of glaucoma and metformin treatment in diabetic Jordanian patients. The prevalence of glaucoma among diabetic patients was 50%. The study of Lin et al<sup>12</sup> showed that the prevalence of glaucoma was about 4%, but they included larger sample size in their study as compared with our study. Actually, they determined the prevalence of glaucoma in general population. In their study, Fredrick et al<sup>13</sup> reported that the prevalence of retinopathy was about 30% among diabetic patients.

The present study did not show a significant association between glaucoma and study variables including age, gender, metformin use and dose. In literature, studies gave various outcomes regarding the relationship between glaucoma and diabetes. Some studies have confirmed a significant relationship between diabetes and glaucoma which implies metformin use and dose<sup>8-9</sup>. On the other hand, other studies did not confirm such a relationship<sup>10-11</sup>. In their study, Lin et al<sup>12</sup> confirmed a significant relationship between metformin dose and glaucoma prevalence.

**CONCLUSION:** The present study showed that the glaucoma is not associated significantly with study

variables included in the study.

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CONFLICT OF INTEREST REPORTED: NIL;

SOURCE OF FUNDING: NONE REPORTED