ORIGINAL ARTICLE

Sociodemographic Factors and Knowledge About Diabetic Complications in Visually Impaired Egyptian Diabetic Patients

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ABSTRACT

PPurpose: To study the Sociodemographic factors leading to blindness or visual impairment in diabetic patients living in Upper Egypt.

Setting: The study included 200 patients recruited from screening campaigns in the Fayoum and Beni Suef governorates in Egypt.

Methods: Patients included in the study were legally blind diabetics (visual acuity ≤ 6/60), and patients answered a specially designed questionnaire when recruited in the study.

Results: Patients' knowledge of the ophthalmic effects and complications was as low as 31%. Laser treatment patients were more aware of diabetic consequences ($p \leq 0.02$). However, with the increase in education level, a noticeable increase in patient knowledge regarding diabetic ocular complications also occurred. ($p \leq 0.001$), patients obtained their knowledge about diabetic complications from their ophthalmologists ($p \leq 0.02$), rather than from the media or the Internet

Conclusions: The media and internets should have a greater role in informing diabetics regarding the importance of controlling blood glucose levels and regular follow-ups in reducing ocular diabetic complications. This can be achieved by increasing the patients' level of knowledge.

Keywords: Vision impairment, Sociodemographic factors, Blindness; diabetes mellitus, Diabetic retinopathy.

Key Messages: A certain degree of education level is essential for the prevention of diabetic retinopathy complications. Health education programs are needed to target diabetics aiming to increase their awareness of disease complications.

INTRODUCTION

Diabetes Mellitus (DM) is a worldwide problem with significantly increasing numbers of diabetics globally. By 2030 the diabetic population is expected to be doubled, which will have an impact on diabetic complications prevalence[1].

Diabetic retinopathy (DR) is the leading cause of blindness in the working-age population (20-64 years old) in developed countries and is the cause of about 12% of blindness annually. Around 40% of people over 40 years with DM had some degree of DR, including about 8.2% with vision-threatening DR[2,3].

Retinal neovascularization (NV) is a significant risk factor for blindness in diabetic patients, with higher risk if the new vessels were at the optic disk. Laser photocoagulation has been the treatment of choice for diabetic macular edema (DME) and DR, but about 60% of proliferative diabetic retinopathy (PDR) patients respond to pan-retinal photocoagulation (PRP), with regression of NV within 3 months. PRP mainly preserves vision rather than restoring it in cases of PDR and DME.[3,4]

DR in Egypt affects 42 % of diabetics. In Egypt, 39.8% of legally blind patients as a complication of diabetes knew that DM can be sight-threatening, while 60.2% were not aware until sight-threatening complications developed. Early retirement in 45.1% due to visual impairment related to DM.[3,5]

Aim of the work

The study aimed to determine sociodemographic factors and knowledge responsible for vision impairment and blindness among DM patients.

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PATIENT AND METHODS

Study design: A cross-sectional study was conducted in the Ophthalmology screening campaigns in the Fayoum and Beni Suef governorates.

The IRB and the ethical committee approved the study and the patients signed the informed consent before enrollment.

This study was conducted on 200 patients with DM.

We used the designed questionnaire of Abueleinen et al. [5]

A full Ophthalmic examination was done for all patients, including a dilated fundus examination. Fluorescein angiography and OCT were done in some patients.

The self-administered questionnaire clearly stated that the data was confidential and anonymous. It will assure the respondents that socio-demographic questions will be for identifying their characteristics, not their identity. There will be space for the respondents to express their opinions and comments.

Patients were asked to answer (written or oral) the specifically designed questionnaire and were fully examined ophthalmologically. Determining Diabetes controlled using the HbA1c test, which was done for all selected patients.

Inclusion criteria

Patients Included in the study had at least 2 of the criteria below including the first criterion.

- Visual acuity ≤ 6/60(Snellen's chart)
- Proliferative DR
- Diabetic macular edema
- Cystoid maculopathy
- Ischaemic maculopathy
- vitreous hemorrhage
- Tractional retinal detachment
- Rubeosis irides
- Nonproliferative DR.

Data were described statistically in terms of mean±standard deviation (SD), frequencies, and percentages when appropriate.

A probability value (*p*-value) >0.05 considered statistically significant. All statistical analyses were done using computer programs Microsoft Excel 2013 (Microsoft Corporation, NY) and SPSS v16 (SPSS Inc., Chicago, IL).

RESULTS

Our study was conducted on 200 eyes of 200 diabetic patients who were legally blind (visual acuity 6/60 or less) due to ocular complications of diabetes. One eye for every patient was selected with the worst best corrected visual acuity.

There were 92 (46%) male patients and 108(54%) female patients. The patients' age was 56.9 ±5.99 years (ranging 47 -69 years), 120 (60%) patients were living in rural areas, while 80(40%) lived in urban areas, as shown in Table 1. The mean onset of diabetes was 13.61 ±3.08 (ranging from 9-20 years), as shown in Table 2.

There were 68 (34%) illiterate patients, 48(24%) of patients were found able to read and write,78 patients (39%) had some degree of education (primary or secondary) up to high diploma only 6 (3%) patients had a graduate degree (university degree), as shown in figure 1.

Diabetes was under control in 8(4%) patients as measured by the HbA1c test, which was taken as a reference for diabetes control. Family history of diabetes found in 96(48%) patients, while 83(41.5%) patients had positive consanguinity.

The most common systemic association was peripheral neuropathy found in 173(86.5%) patients, 120(60%) patients with hypertension, and 30(15%) patients were treated for cardiovascular disease, while only 14(7%) patients were treated for chronic kidney disease.

Table 1. *Sex distribution among patients.*

Sex		Frequency	Percent
	Male	92	46.0
	Female	108	54.0

Table 2. *Shows age of patients and period of onset of diabetes.*

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	200	47.00	69.00	56.90	5.99
Onset	200	9.00	20.00	13.61	3.08

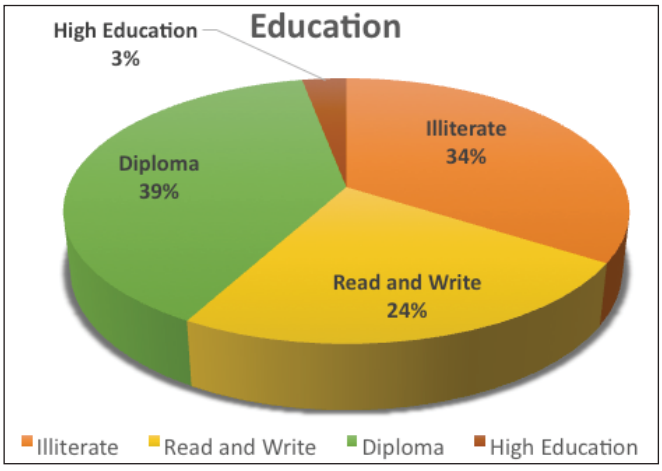

Figure 1.

Regarding ocular associations, 102(51%) patients were found cataractous, glaucoma was found only in 8(4%) patients, 5(2.5%) with open-angle glaucoma, and 3(1.5%) with neovascular glaucoma.

There were 125(62.5%) patients who were followed up with an internist, while 57(28.5%) patients were informed about the importance of regular ophthalmic checkup.

There were 186(93%) patients who asked for ophthalmic consultation due to the sudden drop in vision; only 14(7%) patients came asked for a regular follow-up, and 63(31.5%) patients were aware of the ocular complications of diabetes.

Forty-Four patients (22%) received laser treatment before. There were 126(63%) patients who reported that ocular complications affected their jobs,

Fundus examination, fluorescein angiography, B-scan ocular ultrasound, and optical coherence tomography revealed that 164(82%) had a vitreous hemorrhage, the tractional retinal detachment was found in 77(38.5%) patients, maculopathy (including ischemic, cystoids maculopathy plus foveal hard exudates) represented (36%) of patients, 24 (12%) patients had end-stage diabetic retinopathy, and 7(3.5%) patients had central retinal vein occlusion, as shown in figure 2

There was a statistically significant relationship *(P=0.001)* between knowledge about ocular complications of diabetes and whether patients were informed about the importance of regular checkups or not. While 59.6% of patients who were informed about the importance of follow-up knew complications of diabetes, and those who were not informed only 20.3% of them were aware of complications, as shown in Table 3.

The patients who received laser treatment before were more aware of ocular complications of diabetes (45.5%) than those who did not receive laser treatment before (27.6%); these results were statistically significant (P = 0.02). as shown in table 4.

Table 3. *Residence.*

Residence		Frequency	Percent
	Rural	120	60.0
	Urban	80	40.0

Table 4. *Education level among patients.*

Education		Frequency	Percent
	Illiterate	68	34.0
	Read and Write	48	24.0
	Diploma	78	39.0
	High Education	6	3.0

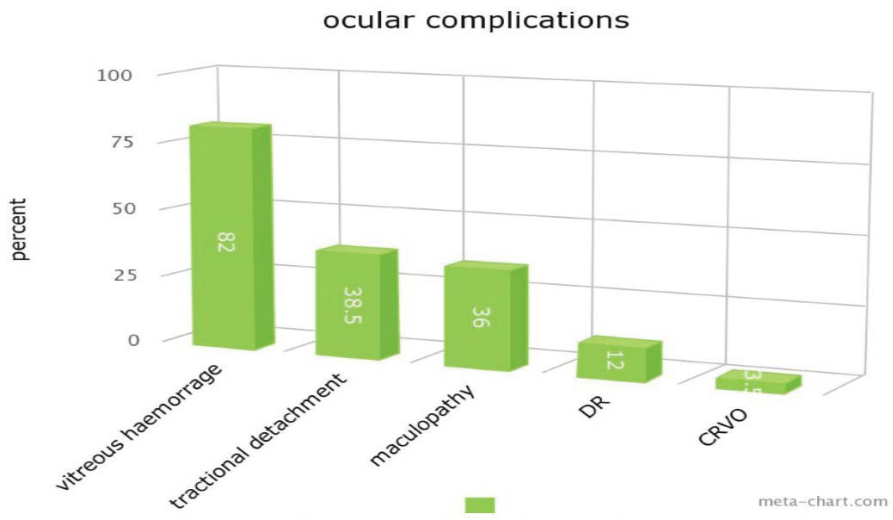

Figure 2. *Ocular complications found in patients.*

Only 11.8% of illiterate patients know about complications of diabetes, while 100% of graduate patients know about complications. The percentage of knowledge increased gradually as the level of education increased, which was statistically significant (P = 0.001), as shown in Table 5

DISCUSSION

Diabetes has many long-term complications that can develop after 10-20 years. Complications may be the first symptom in those who have otherwise not received a diagnosis before that time. Major complications are mostly related to vascular damage, showing that 75% of diabetic deaths are related to coronary heart disease,[6-10]

Diabetes affects the kidneys, causing diabetic nephropathy, eyes causing diabetic retinopathy and peripheral diabetic neuropathy.[10,11,12]

Our study was conducted to discover the social and demographic factors that cause diabetics to develop serious ocular complications.

Only legally blind patients with (visual acuity ≤ 6/60) due to severe ocular complications of diabetes were involved, a full ophthalmic examination was done, andHbA1c was our reference to diabetes control.

Our results show no advantage of sex, residence, family history, or consanguinity on the development of ocular complications of diabetes.

The patient's age was found to affect the occurrence of diabetes with a mean age of 56.9(±5.99). Our results also showed that long-term duration is a factor in the development of complications, as the mean duration of diabetes was 13.61(±3.08).

A cross-sectional study performed by Liu et al also showed that old age and long duration of diabetes were the main factors in the development of diabetes complications. The mean age of their study was 63.3±10.2 years [13.]

An Egyptian study performed by Abulenein et al showed that the mean age of patients who were legally blind due to ocular diabetic complications was 56 years (± 8.56)[5].

According to the HbA1C level, 96% of patients showed poor control of blood glucose levels and only 4% adjusted their mean HbA1c level to 8.9(±1.8).

Liu et al[13] studies showed that the mean HbA1c level was 8.6(± 1.7) for those patients with ocular complications [13].

Trials proved a direct correlation between diabetic complications and blood glucose levels, thus necessitating regular follow- up and tight control of blood glucose but without its associated hypoglycemic hazards. Controlling blood glucose levels prevents known microvascular complications and hinders the progression process. [14]

Although 31.5% of our patients were aware of serious ocular complications of diabetes, 68.5% did not hear about complications before. A study conducted by Tajunisah et al[15]showed that the prevalence of DR and awareness of the eye complications among type II diabetic patients was 86% on the first visit to eye clinic[15].Another study made by Abulenein et al[5] showed that only 39.8% of diabetics with severe diabetic ocular complications knew about complications [5]. Ramke et al[16] showed that only 3.6% of people were aware of ocular complications of diabetes[16]. Mohan et al[17] results were lower than our results and showed that only 18% of patients knew ocular complications of diabetes [17].Ovenseri-Ogbomo et al[18] study showed that only 3.8% of the patients knew about ocular complications of diabetes [18].

Table 5. *Relationship between knowledge about consequences and patient information about importance of regular follow-up.*

			Knowledge about Consequences		
			Yes	No	Total
Informed Of Checkup	Yes	Count	34	23	57
		% within Informed Of Checkup	59.6%	40.4%	100.0%
		% within Knowledge about Consequences	54.0%	16.8%	28.5%
	No	Count	29	114	143
		% within Informed Of Checkup	20.3%	79.7%	100.0%
		% within Knowledge about Consequences	46.0%	83.2%	71.5%
Total		Count	63	137	200
		% within Informed Of Checkup	31.5%	68.5%	100.0%
		% within Knowledge about Consequences	100.0%	100.0%	100.0%
P= 0.001*					

Table 6. *Relationship between receiving laser treatment and knowledge about consequences.*

			Knowledge about Consequences		
			Yes	No	Total
Laser	Yes	Count	20	24	44
		% within Laser	45.5%	54.5%	100.0%
		% within Knowledge about Consequences	31.7%	17.5%	22.0%
	No	Count	43	113	156
		% within Laser	27.6%	72.4%	100.0%
		% within Knowledge about Consequences	68.3%	82.5%	78.0%
Total		Count	63	137	200
		% within Laser	31.5%	68.5%	100.0%
		% within Knowledge about Consequences	100.0%	100.0%	100.0%
P= 0.002*					

Table 7. *Level of education and knowledge about consequences.*

			Knowledge about Consequences		
			Yes	No	Total
Education	Illiterate	Count	8	60	68
		% within Education	11.8%	88.2%	100.0%
		% within Knowledge about Consequences	12.7%	43.8%	34.0%
	Read and Write	Count	8	40	48
		% within Education	16.7%	83.3%	100.0%
		% within Knowledge about Consequences	12.7%	29.2%	24.0%
	Diploma	Count	41	37	78
		% within Education	52.6%	47.4%	100.0%
		% within Knowledge about Consequences	65.1%	27.0%	39.0%
	High Education	Count	6	0	6
		% within Education	100.0%	0.0%	100.0%
		% within Knowledge about Consequences	9.5%	0.0%	3.0%
Total		Count	63	137	200
		% within Laser	31.5%	68.5%	100.0%
		% within Knowledge about Consequences	100.0%	100.0%	100.0%
P= 0.001*					

Although our results showed no statistically significant value of being glaucomatous however 62.5% of glaucomatous patients were aware of complications, while only 30.2% of non-glaucomatous were not aware(p=0.07). This may be due to frequent visits of glaucomatous patients to ophthalmic clinics and contact with other patients.

The relationship between following up with an internist and knowing ocular complications of diabetes was statistically insignificant (p=0.1), although it shows that the information given by internists about ocular complications of diabetes was very few.

Ovenseri-Ogbomo et al[18] stated that 34.6% of patients had no previous eye examination since discovering diabetes.

Patient's knowledge about consequences is affected by whether he or she was informed about the importance of regular ophthalmic checkups;59.6% of patients who were informed about the importance of regular ophthalmic checkups were aware of the serious ocular complications of diabetes, while only 20,3% of patients who were not informed about the complications of diabetes; this is statistically significant (p=0.001).

Although only 22% of patients received argon laser

treatment, our study showed that the relationship between receiving argon laser treatment and knowledge about complications is statistically significant(p=0.02);45.5% of patients who received laser treatment were aware of complications of diabetes on the eye, while just 27.6% of patients who did not receive laser before known complications, laser treatment of diabetic retinopathy and diabetic macular edema decreased the incidence of serious ocular complications by 50% according to Chen et al[19].

Our study showed that the level of education affects knowledge about complications; only 11.8 of illiterates were found to know ocular complications of diabetes. This percentage increases as the level of education rise: 100% of patients with a graduate degree are aware of complications.

Olsson et al[20] reported a negative relationship between the incidence of type-2 diabetes mellitus and level of education, while a positive relationship between the incidence of autoimmune diabetes mellitus and level of education.[20]

Alsous et al. [21] in Jordan where 53.3% had good knowledge scores, which were significantly correlated with attitudes ($p < 0.001$). Higher education level was a predictor of good knowledge and +ve attitudes. About 46.3% of participants had +ve attitudes toward the disease.

CONCLUSION

Diabetes mellitus has serious ocular complications that may cause blindness, and these complications can be reduced. Increasing awareness about ocular complications of diabetes is the mainstay of decreasing complications of diabetes. Increasing knowledge about serious complications may be conducted through long -and short-term strategies. Internists should play a greater role in informing diabetics about the great importance of regular ophthalmic follow-up and serious ocular complications of diabetes. The media also can do more effort on this topic. The level of education was also found to affect knowledge about complications and decrease the incidence of complications.

Limitations of the study:

The sample size is small when we speak about the sociodemographic data for patients in Beni Suef and Fayoum Governments. A multicenter large study should be organized by the ophthalmology departments in Egyptian universities to collect the data from all Egypt

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