

## Research Article

# Visual Acuity Evaluation in Diabetic Macular Oedema with Foveal Hard Exudates



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## Abstract

**Introduction:** Diabetic retinopathy (DR) is one of the main causes of blindness in the middle-aged individuals. (Yau et al., 2012) The primary cause contributing to loss of vision in diabetic patient is diabetic macular oedema (DME). (Williams et al., 2004) Hard exudates are deposits of lipo-protein that is build up as a result of a disintegration of the inner BRB. (Zhou et al. 2018). **Aim of The Study:** Assessment of visual acuity (VA) in patient with diabetic macular oedema with foveal hard exudates. **Patients and Methods:** The study was a case control study. The study included 100 eyes from 100 DME patients that divided into 2 groups. The study was conducted at Ophthalmology department, Minia University Hospital in Egypt between february 2022 and August 2022. **Results:** Presence of hard exudates in fovea in DME was associated with significant decrease of BCVA so Presence of hard exudates in fovea in DME was a bad prognostic sign for DME. **Conclusion :** Presence of hard exudates in fovea in DME affected macular function determined by BCVA and it was a bad prognostic sign for DME.

**Keywords:** Diabetic macular edema, Visual acuity, Hard exudates

## Introduction

Diabetic retinopathy (DR) is one of the main causes of blindness in the middle-aged individuals. (Yau et al., 2012) The primary cause contributing to loss of vision in diabetic patient is diabetic macular oedema (DME). (Williams et al., 2004).

Hard exudates are deposits of lipo-protein that is build up as a result of a disintegration of the inner BRB. Quantitative assessments of hard exudates in DME patients have been connected to serum lipid levels. Involvement of the centre of macula might be more likely when triglycerides are high., which can cause a buildup of subfoveal hard exudates. (Zhou et al. 2018)

Hard exudates are hyperreflective spots greater than 30 um, are present in the outer retinal layers, associated with back-shadowing, and have

reflectivity equivalent to RPE-Bruchs complex. (Vujosevic et al., 2017)

## Aim of the study

Assessment of visual acuity (VA) in patient with diabetic macular oedema with foveal hard exudates

## Patients and Methods

**Study Design:** A case control study.

### Study Population:

The study included 100 eyes from 100 DME patients that divided into 2 groups: Group I included 50 eyes of 50 DME patient with hard exudates at the fovea. Group II included 50 eyes of 50 DME patients without hard exudates at the fovea as a control. Both groups were similar in age and gender the study was conducted at Ophthalmology department, Minia University Hospital in Egypt between february 2022 and August 2022.

**Inclusion criteria:**

Patients with non-proliferative diabetic retinopathy (NPDR) with central involving DME with foveal hard exudates. Urine culture on Buffered Charcoal Yeast Extract (BCYE) Legionella Urine Ag test (UAG) Water culture on Buffered Charcoal Yeast Extract (BCYE)

**Exclusion criteria:**

1. Patients with significant media opacity as corneal opacity, cataract.
2. Patients with other macular pathologies as uveitis, pathological myopia,
3. macular hole, age related macular degeneration, retinal vasculitis and epiretinal membrane
4. Patients with previous history of intra-ocular surgery.
5. Patients with previously treated macular oedema (laser, intravitreal injection or surgery).
6. Patients on topical medications epinephrine or prostaglandin analogs.
7. Diabetic Patients with proliferative diabetic retinopathy (PDR)

**All patients were subjected to:** careful history taking, best corrected visual acuity (BCVA) by decimal scale then converted to LogMAR BCVA for statistical analysis, intraocular pressure by Goldman tonometer, anterior segment examination using slit-lamp biomicroscope and fundus examination by slit lamp examination with auxiliary lens +78D and binocular indirect ophthalmoscopy.

**Results****Demographic data:**

The study included 100 eyes of 100 participants that divided into 2 groups: into 2 groups: Group I included 50 eyes of 50 DME patient with hard exudates at the fovea (24 men and 26 women) Group II included 50 eyes of 50 DME patients without hard exudates at the fovea as a control Group (27 males and 23 females). The mean age in group 1 was  $53.75 \pm 9.07$  years (range, 35-70 years). The mean age in group 2 was  $56.2 \pm 8.2$  years (range, 34-74 years) without statistically significant variations between two groups.

**Table (1): Demographic data of cases and control groups**

	<b>Control (n = 50)</b>	<b>Cases (n = 50)</b>	<b>p value</b>
<b>Age:</b>			
• <b>Mean <math>\pm</math> SD</b>	$56.2 \pm 8.2$	$53.75 \pm 6.07$	<b>0.058</b>
• <b>Range</b>	34 – 74	35 – 70	
<b>Sex:</b>			
• <b>Male N (%)</b>	27 (54%)	24 (48%)	<b>0.816</b>
• <b>Female N (%)</b>	23 (46%)	26 (52%)	

**Correlation between presence of hard exudates in fovea and LogMAR best corrected visual acuity (BCVA)**

Presence of hard exudates in fovea was associated with increased mean of LogMAR BCVA ( $1.13 \pm 0.32$ ) with significant difference from cases without hard exudates ( $0.96 \pm 0.36$ ) ( $p=0.036$ )

**Table (2) correlation between presence of hard exudates in fovea and Log MAR BCVA in DME**

	DME with foveal hard exudates		DME without foveal hard exudates		
	Mean $\pm$ SD	Range	Mean $\pm$ SD	Range	
<b>Log MAR BCVA</b>	1.13 $\pm$ 0.32	0.2 - 1.8	0.96 $\pm$ 0.36	0.1 - 1.5	<b>0.036*</b>

## Discussion

In developed countries, DME is the main cause of blindness in working age persons. (Romero et al., 2016).

Hard exudates are deposits of lipo-protein that is build up as a result of a disintegration of the inner BRB. Quantitative assessments of hard exudates in DME patients have been connected to serum lipid levels. Involvement of the centre of macula might be more likely when triglycerides are high., which can cause a buildup of sub foveal hard exudates. (Zhou et al. 2018).

This research was carried out to determine relationship between presence of foveal hard exudates in DME and macular functional changes detected by visual acuity. The study included 100 eyes of 100 participants that were divided into 2 groups: Group I included 50 eyes of 50 DME patient with hard exudates at the fovea (27 men and 23 women) Group II included 50 eyes of 50 DME patients without hard exudates at the fovea as a control Group

This research showed that presence of hard exudates in fovea was associated with increased mean of LogMAR BCVA ( $1.13 \pm 0.32$ ) with significant difference from cases without hard exudates ( $0.96 \pm 0.36$ ) ( $p=0.036$ ).

Therefore, presence of hard exudates in fovea was a bad prognostic sign for DME. This could be explained by hard exudates are lipid and lipoprotein deposits and appear as white, yellowish or waxy lesions situated mainly in the outer plexiform layer of the retina. Previous investigations have shown that hard exudates may be associated with degeneration of both photoreceptors and neuronal elements in the outer plexiform layer (Garcia et al., 2007) This explained poor visual function that associated with presence of hard exudates.

## Conclusion

Presence of hard exudates in fovea in DME was associated with decreased BCVA so Presence of hard exudates in fovea in DME was a bad prognostic sign for DME.

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