

# Causes of irreversible unilateral or bilateral blindness in the Al Baha region of the Kingdom of Saudi Arabia



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## Abstract

**Purpose:** To determine the causes of irreversible unilateral and bilateral blindness that cannot be rehabilitated medically, optically nor surgically in Al Baha province, Kingdom of Saudi Arabia.

**Methods:** There were a retrospective chart review and examination of patients presenting to King Fahad Hospital Al Baha, Saudi Arabia, with unilateral or bilateral blindness from June 2011 to September 2011. Blindness was defined as best corrected visual acuity (BCVA) of less than 0.05 (Snellen, 20/400) or a visual field no greater than 10° around central fixation. Data were collected on patient demographics, ocular disease either primary or secondary to systemic diseases and laterality if unilateral involvement.

**Results:** One hundred consecutive patients were enrolled in the study. The mean age of the study sample was  $58 \pm 2.28$  years (range, 1–90 years). The male to female ratio was 3:2. The most common cause of blindness in one or both eyes per person was diabetes (30% of patients) followed by glaucoma (23%). Reclassification of the causes of the blindness according on World Health Organization (definition of blindness which included both eyes) did not change the causes of blindness. There were 76% patients with unilateral blindness. The most common causes of unilateral blindness were diabetes mellitus (DM) (19 patients; 27%), glaucoma (17 patients; 23%) and retinal diseases (other than that caused by DM) (17 patients; 23%). In the entire study sample, the male-to-female ratio for patients with blindness from DM was 2:1. Diabetic macular edema caused 87% of the cases of blindness in patients with DM mostly in the left eye.

**Conclusion:** Diabetes mellitus and then glaucoma are the major causes of irreversible blindness in the Al Baha region in Saudi Arabia. Public health plans should be developed to encourage proper patient health education in the region. Additionally, effective screening should be performed at the primary health care centers for diabetes.

**Keywords:** Blindness, Irreversible, Diabetes Mellitus, Al Baha

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## Introduction

Blindness can be due to numerous ophthalmic and systemic diseases.<sup>1</sup> Additionally the cause of visual loss varies between countries and may be even within region of some countries.<sup>2,6,9</sup> In developing countries there is an urgent need to properly allocate resources for optimal delivery of health-care. Hence, regional data on the causes of vision loss would

allow better allocation of resources and public health care planning.

Diabetes is a worldwide disease with ocular sequelae including diabetic retinopathy. Currently diabetic retinopathy is a major cause of visual morbidity and blindness worldwide.<sup>7</sup>

To understand the effect of systemic and ocular disease of blindness in various regions of Saudi Arabia, regional studies

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of the prevalence of blindness are required. Additionally studies that evaluate irreversible blindness in a group of subjects without age-exclusion criteria will provide a realistic estimate of the burden of blindness in a region.

In the current study we evaluate the causes of irreversible unilateral and bilateral blindness that could not be surgically or visually rehabilitated in Al Baha, a province in southwest Saudi Arabia.

## Methods

This cross-sectional study was performed to determine the causes of irreversible unilateral and bilateral blindness that could not be rehabilitated medically or surgically in Al Baha, a province in southwest Saudi Arabia. All patients in the study presented to the King Fahad Hospital in Al Baha. King Fahad Hospital is a tertiary hospital that services a population of 400,000–500,000. Most of the population in Al Baha reside in a mountainous region and are relatively homogenous. In addition to examining the patients attending the ophthalmology clinic, a chart review was performed to collect data of patients who attended the clinic during holidays. This study was performed from June 1, 2011 to the end of September 2011. Subjects who were screened were either new, referred or presented for follow-up or seen in the emergency department.

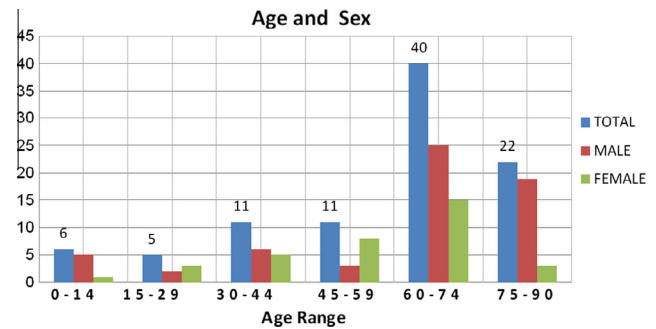
Blindness was defined as BCVA of less than 0.05 (Snellen, 20/400) or a visual field no greater than 10° around central fixation. The staff at KFH referred any patient with BCVA  $\leq$  0.05 in one or both eyes or VF  $<$  15° in one or both eyes to the study coordinator.

Patients were included if they were blind in one or both eyes. Patients were excluded if the cause of vision loss was treatable such as cataract and, corneal opacity occurring in patients older than 5 years, keratoconus, refractive error, recent vitreous hemorrhages, operable retinal disease, and recent diabetic maculopathy. For patients with multiple ophthalmic diseases, only the disease with the greatest effect on vision was recorded. If co-existing systemic disease was considered the primary cause of vision loss then it was recorded.

Data were collected on patient demographics, ocular disease either primary or secondary to systemic diseases and laterality if unilateral involvement. The mean, standard deviation and range were calculated for continuous variables.

## Results

Out of 115 with unilateral or bilateral blindness, 100 consecutive patients were enrolled in the study. The mean age of the study sample was  $58 \pm 2.28$  years (range, 1–90 years; median, 64 years; mode 80 years). The male to female ratio was 3:2. The distribution of age based on gender is presented in Fig. 1. The most common cause of blindness per person was diabetes (30% of patients) followed by glaucoma (23%) (Table 1). Reclassification of the causes of blindness was based on World Health Organization (WHO) criteria, and patients blinded bilaterally showed diabetes as the most common cause of blindness ( $10/24 = 41\%$ ) followed by glaucoma  $5/24 = 20\%$  (Table 2). There were 76% of patients with unilateral blindness of which there were 38 right eyes and 36 left eyes (two patients laterality were not recorded clearly but included in the study for their diagnoses when analyzing the



**Figure 1.** Distribution of age based on gender of patients with irreversible unilateral or bilateral blindness in Al Baha region, Saudi Arabia.

**Table 1.** Causes of irreversible unilateral or bilateral blindness in the Al Baha region, Saudi Arabia.

| Pathology                  | Proportion of patients (N = 100 patients) (%) |
|----------------------------|---|
| Diabetes mellitus          | 30  |
| Glaucoma                   | 23  |
| Retinal diseases           | 17  |
| Deep amblyopia             | 7   |
| Congenital ocular diseases | 6   |
| Trauma                     | 5   |
| Iatrogenic                 | 4   |
| Neurologic                 | 4   |
| Inflammatory               | 3   |
| Hereditary                 | 1   |

Includes severe visual impairment defined as best corrected visual acuity  $\leq$ 0.05 decimal acuity.

**Table 2.** Causes of irreversible bilateral blindness based on World Health Organization definition of bilateral involvement, in the Al Baha region, Saudi Arabia.

| Pathology         | Number of patients (%): 24 patients |
|-------------------|-------------------------------------|
| Diabetes mellitus | 10 (41%)                            |
| Glaucoma          | 5 (20%)                             |
| Congenital        | 4 (16%)                             |
| Neurologic        | 3 (12%)                             |
| Retinal disease   | 1 (4%)                              |
| Hereditary        | 1 (4%)                              |

I defined as best corrected visual acuity  $\leq$ 0.05 in the better eye.

unilateral causes of blindness). The most common causes of unilateral blindness were diabetes mellitus (19 patients; 26%) followed by glaucoma (17 patients; 23%) and retinal diseases (excluding retinal diseases caused by diabetes) (17 patients; 23%) (Table 3). The most common causes of blindness in the right eye (total recorded 38) were retinal diseases (12 cases; 32%), followed by glaucoma (10 cases; 26%), diabetes mellitus (6 cases; 16%), deep amblyopia (4 cases;

**Table 3.** The major causes of unilateral blindness of patients in the Al Baha region, Saudi Arabia.

| Pathology         | Number of patients (%) |
|-------------------|------------------------|
| Diabetes mellitus | 19 (27%)               |
| Glaucoma          | 17 (23%)               |
| Retinal diseases  | 17 (23%)               |

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