Vision impairment among patients attending Al-Aqiq Hospital, Saudi Arabia


ABSTRACT

Objective: This study aimed to assess the most common types of vision impairment (VI) and their incidence in patients who attended the Al-Aqiq Hospital (AqH) eye clinic and to compare the results with other clinics inside and outside Saudi Arabia (KSA).

Methods: This was a retrospective study conducted using the recorded data of patients who visited the AqH eye clinic for eye care from 2021 to 2022.

Results: The study sample included 1,711 patients; among them, female responses (n = 879, 51.4%) outnumbered male responses (n = 832, 48.6%). Most patients were Saudi (n = 1,403, 82.0%), with a mean age of 34.63 ± 21.90 years in women and 36.15 ± 23 years in men. Refractive error (RE) was the most common VI (31%), followed by red eye and allergy (15.7%). Blindness, amblyopia, and age-related macular degeneration were the least common disorders (2%). Other presentations of VI such as corneal dystrophies and infections, constituted 10.5% of patients, while 9.1% of patients did not have VI. In the defined data, presbyopia was the most common type of RE (9.8%), followed by stigmatism (4%). Among female patients, RE, dry eye (DR), trauma, DR, and glaucoma were more common among male patients.

Conclusions: The incidence of VI was higher among female and Saudi patients at the AqH eye clinic. The most common cause of VI was RE, while amblyopia was the least common cause. The rate of routine follow-up was higher than elsewhere in KSA, indicating a high level of knowledge about eye health care.

Keywords: Vision impairment, Al-Aqiq Hospital, Al-Baha, refractive error, amblyopia.

Introduction

Eye health relates to all aspects of life; nonetheless, many individuals, families, and populations struggle to access eye care, leading to permanent vision impairment (VI) and blindness [1]. The consistent relationship between VI and quality of life necessitates an effective ophthalmic intervention, which would improve the quality of life worldwide [2]. The frequency of VI varies considerably among nations and regions; this variation might be mostly due to the availability and accessibility of eye health care [3].

Blindness has a significant negative impact on patients and their surroundings. The health consequences associated with blindness extend beyond the eye and its vision; blindness can severely affect autonomy, mobility, liability for trauma, and mental health as well as social tasks, work, and educational level [4]. There is a strong relationship between VI and pragmatic impairment in both child and adult populations [4]. Glaucoma patients have a significant reduction in social participation,
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The financial cost of VI, including medical costs and lost productivity, is approximately 139 billion dollars per year [3]; accordingly, effective management of avoidable blindness is expected to contribute significantly to the global economy [6].

The World Health Organization (WHO) estimates that at least 2.2 billion people worldwide have VI, one billion of whom have preventable VI [7]. In 2020, blind people worldwide numbered 433 million, with 295 million with moderate and severe VI, 258 million with mild VI, and 510 million with presbyopia, and over half (55%) of all patients were female [6,7]. Between 1990 and 2020, the number of blind people increased by 50.6%, with the same increase for patients with moderate and severe VI; this trend is predicted to continue until 2050 [6].

Refractive error (RE) is the leading cause of VI, followed by cataracts, whose rate is increasing, although the cataract surgery rate has also increased, which is mostly due to the change in the age structure mainly among women [7].

Conjunctivitis is the most common cause of red eye, which, in turn, is the main sign of eye inflammation, which generally presents as benign, while other causes, including keratitis, uveitis, scleritis, blepharitis, corneal abrasion, foreign body, and trauma, are less common [8]. Sometimes, the red eye represents a real emergency, especially when it is accompanied by severe pain, marked defective vision, and photophobia [9]. A study in the emergency clinics of Ohud Hospital, Madinah, Saudi Arabia (KSA) found that conjunctivitis was the most common attending VI (32.5%), followed by diabetic retinopathy (DR) (18%) [10]. Dry eye disease (DED) affects the ocular surface and is characterized by a patients’ deficiency, usually associated with allergies; this disease significantly affects patients’ lives [11].

The three leading causes of VI in KSA in order of prevalence are cataract, RE, and glaucoma; however, the incidence of these causes varies significantly between regions [3]. Surprisingly, a study among children in Rwanda revealed that, in bilateral blindness or severe VI, the main causes were congenital cataracts and RE, with the same rate (18%) [12].

Research efforts have been conducted around the world to explore the prevalence of VI [9]. It is essential to conduct such research to update policies and improve clinical practices, ensuring high-quality eye care [13]. To determine the deficiency of detailed data on many patterns of eye disorders (PEDs) in healthcare centers, contemporary research is needed on common ocular diseases in the Al-Aqiq region. The present study aimed to determine the most common VI among the eye clinic patients attending Al-Aqiq Hospital (AqH) during 2021–2022 and to explore the current state of eye care in the Al-Aqiq region, KSA.

Subjects and Methods

This was a retrospective, descriptive hospital-based study, conducted at the AqH eye clinic, Al-Baha, KSA, which is a secondary hospital, to evaluate the status of VI, the most common eye-related disorder. The clinic provides eye care and follow-up, in addition to minor surgical interventions such as foreign body removal. Selected ocular cases refer to King Fahad Hospital (KFH) in Al-Baha, which is a tertiary hospital. Eye care services are provided by eye consultants, specialists, residents, optometrists, and various nursing staff.

The study population includes all recorded and archived Saudi and non-Saudi patients who visited the eye clinic or were referred from primary health care centers for diagnostic and treatment purposes, without regard for their age or gender. The variables collected were age, gender, and ophthalmic presentations. From the more than 2,000 total medical records collected, recorded, and stored at the hospital, 1,711 patient records were selected for this study.

Based on the study objectives, the members of the research team used a structured questionnaire to collect relevant data from the patients’ archived records from the eye clinic. All patient records were screened and checked for missing data, errors, and irrelevant information before statistical analysis to ensure their validity and reliability to achieve the study objectives.

Simple descriptive statistics such as frequency and percentage were used to describe the distribution of patients’ clinical characteristics. A statistical package for social science (SPSS) software (SPSS, version 16) and Microsoft Excel programs were used to analyze the study results and remove any bias from the data. The independent t-test was used to compare means. A p-value of ≤0.05 was considered statistically significant.

Results

In the data, female responses (n = 879, 51.4%) outnumbered the male responses (n = 832, 48.6%). Most patients were Saudi (1,403, 82%), with a mean age of the female patients as 34.63 ± 21.90 years and of the male patients as 36.15 ± 23 years (Table 1).

Most of the patients (31%) had RE, followed by red eye and allergy (15.7%), dry eye (DR) (8.4%), trauma and emergency (8.4%), cataract (6.5%), abnormal eye growth (2.9%), strabismus (2.3%), DR (2.1%), glaucoma (1.5%), and KC (0.7%) (Figure 1).

Patients who did not have VI accounted for 9.1%. The overall graph indicates that RE was the most common ophtalmic disorder in the AqH eye clinic. In the AqH records, 82.6% of RE cases were undefined. In the defined data, presbyopia (9.8%) was the most common type of RE (Figure 2).

Among women, RE, DE, trauma, emergency tumors, strabismus, and KC were higher among females, while...
red eye and conjunctivitis, cataract, DR, and glaucoma were higher among men (Table 2).

**Discussion**

From the data analysis, it was found that 51.4% of the patients were female, while 48.6% were male. This is the same gender ratio found in other similar studies, where female patients frequently represented a higher percentage than male patients [8]. In contrast, a study by Tugal-Tutkun et al. at Istanbul University, conducted from 1980 to 1998, found that male patients represented 68% and female patients only 32% [14]. A study in India found a preponderance of male patients [15], and the same result has been found in studies conducted in KSA [16]. The difference in these results might be due to sociodemographic variations across regions. Furthermore, in the present study, 91.8% of the patients were Saudi, while 8.2% were non-Saudi, reflecting the extended coverage of health care services, which is in line with global eye care recommendations that treat eye health as an essential part of universal health care coverage [1].

Furthermore, the analysis of common eye disorders showed that 31% of the patients who were reviewed at the AqH eye clinic had at least one type of RE. Other complaints of eye disorders were conjunctivitis and red eye, dryness, cataracts, trauma, glaucoma, and DR. These results support other studies that found RE is very common among Saudi adults, at about 46% [3]. Similarly, a prevalence of uncorrected RE was found at approximately 51% among primary and secondary school children [17] and approximately 43.6% among students in Riyadh, KSA [8]. This result contrasts considerably with the findings of a study conducted in Rwanda among children, which revealed that RE and congenital cataracts both have the same prevalence (18%) and constitute the main causes of VI [12].

Unfortunately, only 17.4% of RE types were reported in the AqH records, while the remaining cases of RE (82.6%) were undefined. In this study, the prevalence of RE types is calculated from the defined data, showing that presbyopia is the most common type (9.8%), followed by stigmatism (4%), hypermetropia (1.9%), and myopia (1.7%). These results are very different from

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>879</td>
<td>51.4</td>
<td>-</td>
</tr>
<tr>
<td>Male</td>
<td>832</td>
<td>48.6</td>
<td>-</td>
</tr>
<tr>
<td>Patient nationality</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Saudi Arabia</td>
<td>1,403</td>
<td>82.0</td>
<td>-</td>
</tr>
<tr>
<td>Non-Saudi</td>
<td>127</td>
<td>7.4</td>
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</tr>
<tr>
<td>Missed</td>
<td>181</td>
<td>10.6</td>
<td>-</td>
</tr>
<tr>
<td>Age (Mean ± S.D)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>36.15 ± 23.74</td>
<td>0.099</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>34.63 ± 21.90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 1.** The most common VI in the Al-Aqiq region.
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Other similar studies, such as Parrey and Elmorsy study, which showed that the most common RE in order of prevalence is myopia, hyperopia, and stigmatism [18]. Another study in Riyadh, KSA, revealed that myopia was the most common RE among both genders (65.7%) [19]. Furthermore, another study found that cylindrical errors were more common [17], supported by a study in Taif, which found that the distribution of stigmatism was 50.14% [16]. The variations in these results might be due to the variability in data sources or population; most likely, it is due to the low percentage of defined records in the AqH data in the present study.

In this study, conjunctivitis and red eye represent the second cause of VI (15.7%). This is consistent with the available literature, which reveals that conjunctivitis is the leading cause of red eye [8]. Similarly, a study in Madinah, KSA, found that conjunctivitis was the most common attending VI (32.5%), followed by DED (18%) [10]. DED in this study was 8.8% and occurs immediately after red eye. In addition, the literature has found that DED is usually associated with allergies [11]. The red eye is generally a benign condition but can sometimes represent an ocular emergency [9].

In this study, trauma and emergencies represented 8.4% of total cases. This is significantly higher than in a study conducted in the emergency eye clinics of Ohud Hospital, Madinah, KSA, where the presenting eye traumas were 3.5% [10]. A study in Canada at an emergency eye center found that most of the cases were due to inflammation (32%) and ocular trauma (22%) [20].

Cataract represents the fifth cause of VI (6.5%), which is an indication of early detection and treatment of cataracts. In Jazan, southern KSA, cataract is the leading cause of VI (58.6%) [21], while the prevalence of cataracts is 29% in Riyadh, KSA, and it is the second cause of VI after RE [22].

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**Table 2. Common eye-related disorders by gender.**

<table>
<thead>
<tr>
<th>VI</th>
<th>Total (N)</th>
<th>Female</th>
<th></th>
<th>Male</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>REs</td>
<td>350</td>
<td>234</td>
<td>61.1</td>
<td>206</td>
<td>38.9</td>
</tr>
<tr>
<td>Red eye</td>
<td>268</td>
<td>114</td>
<td>42.5</td>
<td>154</td>
<td>57.5</td>
</tr>
<tr>
<td>DE</td>
<td>150</td>
<td>80</td>
<td>53.3</td>
<td>70</td>
<td>46.7</td>
</tr>
<tr>
<td>Emergency</td>
<td>143</td>
<td>85</td>
<td>59.4</td>
<td>38</td>
<td>26.6</td>
</tr>
<tr>
<td>Cataracts</td>
<td>111</td>
<td>50</td>
<td>45.0</td>
<td>61</td>
<td>55.0</td>
</tr>
<tr>
<td>Tumors</td>
<td>50</td>
<td>26</td>
<td>52.0</td>
<td>24</td>
<td>48.0</td>
</tr>
<tr>
<td>Strabismus</td>
<td>39</td>
<td>24</td>
<td>61.5</td>
<td>15</td>
<td>38.5</td>
</tr>
<tr>
<td>Diabetic retinopathy</td>
<td>36</td>
<td>14</td>
<td>38.9</td>
<td>26</td>
<td>72.2</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>26</td>
<td>11</td>
<td>42.3</td>
<td>15</td>
<td>57.7</td>
</tr>
<tr>
<td>Keratoconus</td>
<td>12</td>
<td>9</td>
<td>75.0</td>
<td>3</td>
<td>25.0</td>
</tr>
</tbody>
</table>

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*Figure 2. The details of refractive disorders.*
The prevalence of DR in this study is only 2.1%. This result is significantly lower than all other similar studies conducted in KSA. In Abha, among type 2 diabetic patients, 36.4% had DR [23]. In Jazan, the prevalence of DM was 22.4%, among whom 27.8% had DR [24]. This difference might be because the majority of the follow-up of diabetic patients was in the Diabetic Centre at KFH, Al-Baha, which has an eye unit.

This study reports a prevalence of 2.9% of ocular tumors, such as chalazion, pterygium, pinguecula, and style, all of which are benign conditions, and a case of retinoblastoma, which is similar to a study in a tertiary center in KSA. From 2015 to 2019, the study found that most eye lesions were benign (91%) [25]. The absence of malignant tumors might be due to direct follow-up in the tertiary hospitals of Al-Baha.

In this study, glaucoma, including all its types, was the eighth cause of VI, with a prevalence of 1.5%, and was more common among men (57.7%). Unfortunately, a nationwide study reporting the prevalence of glaucoma in KSA was not found, but different studies from various regions of KSA show that OAG is the most common type in Eastern and Western communities at rates of 60% and 30.5%, respectively [26].

The prevalence of squint in this study was 2.3%, and it was more in women (61.5%) than men (38.5%). This rate is significantly lower than the prevalence observed in Arar, northern KSA (14.7%) [27].

The prevalence of both amblyopia and blindness in this study was only 0.2%, which might be due to the lower rate of RE and strabismus and might reflect a high level of knowledge and attitude among parents of patients, which, in turn, can promote eye care. The WHO revealed that the spread of amblyopia was 1.75%, much higher in Europe (3.67%) and much lower in Africa (0.51%), with high heterogeneity (98%) [28]. A KSA study designed to determine the prevalence and causes of amblyopia revealed that the prevalence of amblyopia was 3.9%, which is equal to or above other published results, and RE was the leading cause of lazy eyes [29]. It was concluded that the prevalence of amblyopia in this study was 0.2%, which is significantly lower than elsewhere.

Fortunately, 9.2% of the patients seen in the AqH eye clinic attended routine eye examinations, which is a good indication of a high level of awareness among the Al-Aqiq population. Routine eye examinations are valuable for detecting various types of VI and are critically important for people with chronic diseases such as DM [30].

**Conclusion**

This analysis showed that, in the AqH eye clinic, the frequency of female patients was higher than male patients. RE was the most common VI in this population, followed by red eye and conjunctivitis, DE, trauma and emergency, cataracts, tumors, squint, DR, glaucoma, and KC, while amblyopia, blindness, and AMD are the least common. Further analysis of RE shows that the most common types of RE are presbyopia astigmatism, hyperopia, and myopia, which is different from the findings of other studies. The vast majority of the RE data was undefined. The study reported a significantly low prevalence of cataracts, amblyopia, DR, and tumors and a high rate of routine follow-up, which indicates a high level of knowledge and attitude toward eye health care. The study reflected female predominance in RE, DE, trauma and emergencies, tumors, strabismus, and KC, while red eye and conjunctivitis, cataracts, DR, and glaucoma were higher among the male population.

Public health policies should be improved concerning the PEDs among the population, and patients in the Al-Aqiq region should be advised of timely and precautionary procedures and strategies to improve their eye health.

**List of Abbreviations**

- **AMD** Age-related macular degeneration
- **AqH** Al-Aqiq hospital
- **DE** Dry eye
- **DED** Dry eye disease
- **DR** Diabetic retinopathy
- **KC** Keratoconus
- **KFH** King Fahd hospital
- **KFH** Kingdom of Saudi Arabia
- **PAC** Primary angle closure
- **PACG** Primary angle closure glaucoma
- **PED** Patterns of eye disorders
- **POAG** Primary open-angle glaucoma
- **RE** Refractive error
- **VI** Vision impairment
- **WHO** World Health Organization

**Conflict of interest**

The authors declare that there are no conflicts of interest regarding the publication of this study.

**Funding**

None.

**Consent to participate**

Informed consent was obtained from all participants.

**Ethical approval**

Ethical clearance was obtained from Al-Baha University, Faculty of Medicine, Scientific Research and Ethics Committee via reference number REC/SUR/BU-FM/2022/19, dated: 22/05/2022.

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