Community ophthalmology clinic utilization and morbidities results from a private primary healthcare center in Saudi Arabia

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Abstract:
PURPOSE: To study the utilization of the ophthalmology clinic in a primary care setting through number and type of ophthalmic cases that were managed.

METHODS: This retrospective descriptive study included all ophthalmic cases treated during a 6-month period in a private sector primary healthcare center ophthalmology clinic in 2018. We measured clinic utilization by recording the proportion of patients treated among the total number of patients treated in the center, the number of visits during different times of day, and the most common diagnoses encountered.

RESULTS: Among 32,518 visits to the health center during the study period, we recorded 422 (1%) visits to the ophthalmic clinic. First visits were 406 cases, and 16 were the follow-up visits. Patients tended to utilize the evening sessions more than morning sessions, with a median of 23 patients per month. Refractive errors in 89 cases (22%) and blepharitis in 88 cases (22%) were the most common diagnoses encountered. Visually significant cataract was not recorded in this study with a prevalence of 31% (14/45) in the >50 years of age group. Seven cases (2%) required referral to hospital during the study period for secondary eye care.

CONCLUSION: Since most cases in this study were managed in the clinic with good utilization of the services offered, we concluded that a community ophthalmology clinic as a first contact would be useful in some primary healthcare centers. More studies are needed in different regions/settings before widely establishing the service in Saudi Arabia.

Keywords: Community Ophthalmology, Utilization, and Saudi Arabia

INTRODUCTION

A central theme in the 2030 Country Vision for Saudi Arabia (SA) is to develop a vibrant society by creating strong foundations through healthcare. This theme is in the process of becoming a reality through the achievement of multiple goals.[1] The Ministry of Health (MOH) developed a healthcare transformation strategy to meet the Level-3 goal of facilitating access to healthcare. This strategy included organizing the processes followed in primary, secondary, and tertiary levels of care, reducing waiting times, and improving primary healthcare delivery.

Primary eye care is an area that has been under discussion since the development of the 2001 National Prevention of Blindness program, when SA signed the Right to Sight initiative. The inclusion of eye care into primary healthcare centers (PHCs) is mandatory. This mandate enabled a reduction in the influx of cases to secondary and tertiary eye clinics, for cases that could be managed in the community.

Data are limited on the number of patients with ophthalmic complaints that visited PHCs in SA. However, in 2014, visits to secondary hospital eye clinics comprised 12% of all visits to outpatient services in MOH hospitals (1,435,438 of 12,075,030 visits).[2] A few studies were conducted in secondary hospitals that evaluated the types of ocular morbidities treated. When all
age groups were included, they showed that the most common diagnoses in the eye clinics were conjunctivitis (31.7%), refractive errors (20.9%), and cataracts (14.8%). Only one study was conducted by a governmental community ophthalmology clinic, and that was in the Alahsa region of SA. They found that a majority of cases (93%) could be managed in the community clinic; patient satisfaction with the care provided was 88%–95%. Another study conducted in 2011 reviewed cases referred from the PHCs in Northern SA for visual impairment. They reported that the most common diagnoses in adults were refractive errors (36%) and cataracts (29.1%).

Unfortunately, we lack epidemiological studies on ophthalmic diseases in SA. Most studies primarily examined the causes of blindness and visual impairments. Only one study was conducted with pediatric subspecialty training.

The present study aims to determine the utilization of an ophthalmology clinic in a primary care setting from the private sector. To our knowledge, this study is the first of its kind in SA.

**Methods**

This retrospective descriptive study included all ophthalmic visits to the Al Hayat Medical Poly Clinic in Riyadh city (the capital of SA). Al Hayat medical clinics offer primary care-based services. They include Pediatrics, Obstetric-Gynecology (Ob-Gyn), Internal Medicine, Orthopedic, and Ear-Nose-Throat Clinics, which provide care on 6 days of the week, in evening and morning sessions. Ophthalmology clinics were offered as part time, with five sessions available for a total of 34 h per week. These walk-in clinics covered the health catchment area of Ishbilia in the eastern district of Riyadh city. The clinics were open on Sunday, Monday, and Wednesday, from 9:00 to 17:00, and on Tuesday and Thursday, from 16:00 to 21:00. The clinic is covered by a consultant ophthalmologist with pediatric subspecialty training.

Equipment in the clinics includes slit lamps, autorefractors, trial lens boxes, retinoscopes, 20 D/90 D lenses, indirect/direct ophthalmoscopes, and applanation tonometer. Dilating drops and topical anesthesia were also available for refraction in pediatric cases and for full retinal exams. Vision charts included the E chart and pictures. Visual impairment was defined according to the WHO definition.

The clinic utilization is analyzed using the number of patients seen, and proportion of ophthalmic visits from total visits to center by session, and month. The proportion of ophthalmic visits was calculated from the total of visits to the PHC during the study period. We did not include a no-show rate, due to the walk-in nature of the clinic.

The patients sometimes had multiple reasons for the visit (RFV); thus, the RFVs were categorized as first or second complaints. In this study, the morbidity analysis included only new RFVs during the period from July 1 to December 31, 2018; follow-up visits (within 14 days) for the same complaints were not included in the summary. Demographics of the patients included sex, age, and type of healthcare coverage (insurance or self-pay). For each patient, complaints and diagnoses were recorded in the electronic file. Data were collected using ophthalmic assessment sheet from the electronic patient file. Complaints were categorized by location and symptom as reported by the patient.

Morbidities were labeled as first, second, or third diagnoses, based on the order that the RFVs were recorded in the patient history section. Diagnoses were coded according to the International Classification of Diseases, 9th Revision. If the first diagnosis was nonophthalmic, the ophthalmic second diagnosis was used for the visit. The label refractive error was further categorized as myopia (≥−1.00 sphere), hypermetropia (≥+1.00 sphere), and astigmatism (≥1.00).

This study was approved by the King Khalid Eye Specialist Hospital Research Center Internal Review Board. All identifiable patient data were anonymized by the author.

**Statistical analysis**

Descriptive analyses were performed with the StatsDirect program (StatsDirect Ltd. Birkenhead, UK.). The Microsoft Excel program was used to collect all electronic patient assessment data.

Demographic data are expressed as frequencies. Age was categorized into 10-year age groups; patients younger than 1 year were recorded in the data sheet as 1 year of age, and they were included in the ≤10-year age group.

The frequency of each morbidity was calculated as a percentage of the total number of visits during the study, regardless of whether multiple diagnoses were given at a single visit.

**Results**

A total of 422 visits to the ophthalmology clinic were recorded during the 6-month study period. During the same period, a total of 32,518 visits to the health center were recorded. Thus, the proportion of ophthalmic clinic visits was 1%. The utilization of ophthalmic visits by month is shown in Table 1 and time of day [evening vs. morning] in Figure 1; with evening sessions showing higher utilization with a monthly median number of 23 patients on midweek clinic.

There were 406 new visits in the ophthalmology clinic, and the demographics of the patients are summarized in Table 2. The other 16 visits out of the total 422 visits were follow-ups (within 14 days) for the same complaints. Only 12 patients made repeat visits to the clinic with new complaints during the study period.

Most visits (166/406, 40%) were made by patients aged 21–40 years. Females made slightly more visits (52%)...
than males. Of 406 visits, 115 (28%) included two or more unrelated ophthalmic complaints during the same visit. The most common first complaints were reduced vision (29%) and foreign body sensations (14%). Among patients with at least two complaints (115 visits), the most common second complaints were eye redness (17%) and eye discharge [15%; Figure 2].

Most visits (306/406, 75%) included two ophthalmic diagnoses during the same visit. Refractive errors and blepharitis were the most common diagnoses [Table 3].

The distribution of diagnoses with refractive errors were myopia (51/406, 13%), astigmatism (24/406, 6%), and hypermetropia (14/406, 3%). In the ≤10 years of age group, myopia was the most common diagnosis (15/79, 19%), and in the >10–20 years of age group, myopia made up (15/65, 23%).

Seven cases (2%) required referral to a secondary eye care clinic for management. Those cases were choroidal lesion in a colon cancer patient (1 case), abnormal cupping of optic nerve (1 case), diabetic retinopathy treatment (3 cases), contact lens fitting for keratoconus (1 case), and exposure keratopathy (1 case).

A visually significant cataract (best-corrected vision worse than 20/30) was not a primary diagnosis in this study, but it was recorded as an incidental diagnosis. The prevalence of cataracts was 31% (14/45) in the >50 years of age group, 6 cases were labeled as a primary diagnosis since patients presented with blurred vision [Table 3], while 8 cases were incidental diagnosis.

Visual impairment was recorded in 4.2% in this study (17/406). Of these, in 13 cases, the complaint was poor vision, and in 4 cases, the complaints were foreign body sensation and pain. The most frequent cause of visual impairment was a refractive error (9 cases), followed by functional visual impairment (3 cases), corneal disease postsurgical complications (3 cases), and diabetic retinopathy (2 cases).

**Table 1: Proportions of visits to the ophthalmology clinic during study**

| Month    | Ophthalmology | All clinics | Proportion (%) |
|----------|---------------|-------------|---------------|
| July     | 70            | 3952        | 2             |
| August   | 57            | 3775        | 2             |
| September| 71            | 5827        | 1             |
| October  | 85            | 6530        | 1             |
| November | 72            | 6247        | 1             |
| December | 67            | 6187        | 1             |
| Cumulative| 422         | 32,518      | 1             |

**Table 2: Demographics of the patients that visited the ophthalmology clinic**

| Descriptive data | Frequency | Proportion (%) |
|------------------|-----------|----------------|
| Males            | 196       | 48             |
| Females          | 210       | 52             |
| Health plan      |           |                |
| Insurance        | 311       | 77             |
| Self-pay         | 95        | 23             |
| Age groups (years) |       |                |
| ≤10              | 79        | 19             |
| >10-20           | 65        | 16             |
| >20-30           | 83        | 20             |
| >30-40           | 83        | 20             |
| >40-50           | 51        | 13             |
| >50              | 45        | 11             |

**Figure 1:** Utilization of the ophthalmology clinic, by time of day and month. The clinics were open on Sunday, Monday, and Wednesday from 9:00 to 17:00 (morning session) and on Tuesday and Thursday from 16:00 to 21:00 (evening session).

**Figure 2:** Frequencies of reasons for visiting the clinic. Total numbers of first complaints = 406 visits, second complaints = 115 visits. FB: Foreign body.

**Discussion**

A previous study from SA by Al-Eissa investigated morbidity patterns in adolescents that visited PHCs. Of the 764 cases reviewed, they found that 3% involved eye complaints.[9] Analyses of governmental PHCs data for the prescribed medications frequency indicated that 3.1% of prescriptions were related to eye diseases from all age groups and 1.5% in patients under 5 years of age.[10,11] Those studies provided indirect information on the ophthalmic morbidities faced in PHCs. Those reports were consistent with the findings in the present study; 1%–2% of the RFVs were ophthalmic complaints, in countries such as South Africa, Tunisia,
and Malaysia, which had age distributions similar to that observed in SA.\cite{12-14}

This study was the first to investigate the utilization of a community ophthalmology clinic in the private sector. Only one similar study was conducted in SA, but in a governmental primary eye healthcare center. In that study, the distribution of morbidities was similar to the distribution observed with blepharitis, the second most common diagnosis in the present study. That finding might be explained by the dry, dusty climate in Riyadh city. In contrast, the Alahsa study finding that conjunctivitis was the second most common diagnosis was expected, because Alahsa is an agricultural community. While a higher number of patients were seen in the Alahsa community ophthalmology clinic, this study clinic was a newly established service for only 6 months before data collection in a location with two other ophthalmology clinic services offered.\cite{6}

Cataract prevalence was 31% in the >50 years of age group; that rate was higher than the 25.2% rate reported from the southern region of SA most probably due to the selection bias in this study since it is a descriptive clinic-based study.\cite{15}

A recent study assessed whether optometrists might be useful in PHCs in SA. They reported that, out of 2601 cases reviewed from ophthalmology clinics in 10 hospitals, 54.4% were treated by prescribing glasses, 20.6% were given medications, 11.4% underwent surgeries, and only 0.6% were referred for major investigations.\cite{16} Those authors proposed that optometrists should be the first point of contact in ophthalmic cases in PHCs. That proposal is not in line with the findings from this study, since only 28% of the cases could have been managed by an optometrist [Table 3].

The Royal College of Ophthalmologists and the College of Optometrists defined the term, “community ophthalmology” by presenting a model that showed the potential benefits of a community clinic. That model might be useful to follow in SA, where low-risk eye problems could be managed in the community, instead of referring them to secondary eye care clinics.\cite{17}

This study had some limitations. First, we could not avoid a selection bias, because the study was a clinic-based descriptive study, conducted in a privately-run clinic, where the majority of the population had private insurance. Moreover, the city district covered by the center was mainly populated by younger individuals; thus, the older, uninsured population was not well represented. This selection bias could be eliminated by repeating the study in other districts of Riyadh city, in a governmental PHC. The second limitation was utilization study was limited (no-show rate) since the clinic was newly established and walk-in based.

The data from this study are important because it showed the utilization of the ophthalmology clinic in a primary healthcare setting was good and that most cases could be managed in the community by a part-time ophthalmologist. The most basic ophthalmic equipment can be purchased for the clinics to be established. These services will need to be considered for the

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Table 3: Frequencies of diagnoses for patients with presenting ophthalmic complaints

| Diagnosis                                | Age group (years) | Frequency (%) |
|------------------------------------------|-------------------|---------------|
|                                          | 1-10              | 11-20         | 21-30 | 31-40 | 41-50 | 51-60 | >60   |
| Chalazion                                | 4                 | 5             | 9     | 8     | 3     | 1     | 1     | 31 (8) |
| Presbyopia                               | 0                 | 0             | 0     | 4     | 16    | 3     | 1     | 24 (6) |
| Blepharitis                              | 0                 | 10            | 30    | 19    | 15    | 6     | 8     | 88 (22) |
| Refractive errors*                       | 28                | 27            | 8     | 15    | 7     | 4     | 2     | 89 (22) |
| SPEs                                     | 1                 | 2             | 3     | 2     | o     | 0     | 1     | 9 (2)   |
| Corneal abrasion                         | 11                | 1             | 4     | 1     | 1     | 0     | 0     | 18 (4) |
| Corneal F.B.                             | 0                 | 1             | 1     | 0     | 0     | 0     | 0     | 2 (0.5) |
| Deep keratitis                           | 2                 | 1             | 4     | 1     | 1     | 1     | 0     | 10 (2.5) |
| Abnormal TIBUT                           | 0                 | 1             | 4     | 5     | 0     | 0     | 0     | 10 (2.5) |
| Conjunctivitis bacterial/viral           | 13                | 1             | 4     | 3     | 0     | 1     | 1     | 23 (6) |
| Conjunctivitis allergic                  | 4                 | 4             | 2     | 1     | 0     | 0     | 0     | 11 (3) |
| Other conjunctiva disease                | 1                 | 1             | 1     | 3     | 1     | 1     | 0     | 8 (2)   |
| Cataract*                                | 0                 | 0             | 0     | 0     | 0     | 4     | 2     | 6 (1.5) |
| Squint                                   | 1                 | 1             | 0     | 0     | 0     | 0     | 1     | 3 (1)   |
| Nonophthalmic headache                   | 1                 | 2             | 1     | 2     | 2     | 1     | 0     | 9 (2)   |
| NLD obstruction                          | 3                 | 0             | 0     | 0     | 1     | 0     | 0     | 4 (1)   |
| Pterygium                                | 0                 | 0             | 3     | 2     | 0     | 1     | 0     | 6 (1)   |
| Wrong glasses                            | 1                 | 2             | 0     | 2     | 0     | 0     | 0     | 5 (1)   |
| Eyelid atopic dermatitis                 | 1                 | 0             | 3     | 2     | 1     | 0     | 0     | 7 (2)   |
| Other eyelid abnormality                 | 0                 | 1             | 2     | 3     | 2     | 1     | 0     | 9 (2)   |
| Other diagnosis*                         | 2                 | 3             | 7     | 2     | 2     | 4     | 20 (5) |
| Normal                                   | 6                 | 7             | 0     | 1     | 0     | 0     | 0     | 14 (3) |
| Grand total                              | 79                | 65            | 83    | 83    | 83    | 51    | 26    | 406     |

*All types of refractive errors; Other include diagnosis with <2 frequency or nonophthalmic diagnosis; Only primary diagnosis with cataract included in the table. SPEs = Superficial punctate erosions; TIBUT = Tear break-up time < 12 s; NLD = Nasolacrimal duct.
new PHC model in the 2030 Vision developed by SA. Further studies are needed to assess the frequency that eye complaints are recorded as the RFVs in selected PHCs around the country. It is essential to know the loads that these clinics might expect in each region and to plan accordingly.

**Conclusion**

Since most cases in this study were managed in the clinic with good utilization of the services offered, we concluded that a community ophthalmology clinic as a first contact would be useful in some primary healthcare centers. More studies are needed in different regions/settings before widely establishing the service in Saudi Arabia.

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**Conflicts of interest**

There are no conflicts of interest.

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