

Epidemiology of red eyes in a teaching hospital in Ghana

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ABSTRACT

Objective: To determine the epidemiological characteristics and aetiology of red eyes in a teaching hospital in Ghana.

Design: This was a retrospective hospital-based case study.

Materials and Methods: The files/ folders of new patients with red eyes during the study period were retrieved. The epidemiological characteristics and diagnosis were perused and the relevant data extracted using a structured questionnaire for each patient and the data was analysed.

Results: Nine hundred and six (47.09%) new patients who presented to the eye clinic had a red eye. There was no statistically significant difference between males and females among new patients who presented with a red eye and those who presented with other eye disease ($p=0.75$). Six hundred and seventy four (74.40%) new patients with red eyes were below the age of 30 years and 521 (57.51%) were children and/or students ($p<0.00$). The top 5 eye diseases that accounted for the red eye in our study were conjunctivitis (48.23%), ocular trauma (39.85%); infective keratitis/corneal ulcer (5.96%), uveitis (3.42%) and scleritis (1.10%).

Conclusion: The red eye represented approximately 47% of all new patients that attended the Eye Clinic during the study period and most of the causes were avoidable, preventable and/or treatable.

Key words: Epidemiology, Red, Eye, Ghana

INTRODUCTION

The red eye is the cardinal sign of ocular inflammation, almost any part of the eye, including the lacrimal glands and eyelids, or faulty tear film can lead to red eye and it is one of the most common ophthalmologic conditions in the primary care setting¹. In a study done on the differential diagnosis of red eye: a survey of medical practitioners from Eastern Europe and the Middle East, red eyes accounted for approximately 15% of consultations with ophthalmologists².

In a study done in Nigeria on the pattern of red eye in a tertiary eye clinic, 4,550 patients presented to the eye clinic, out of which 2,623 (57.6%) presented because of red eye³. In a rural setting, in the Bawku Hospital eye unit in Ghana, a total of 21,391 patients were seen as outpatients, out of which 8,931 were red eyes, representing over 40% of the total number of patients screened⁴.

Redness in the eye can be caused by many conditions and injuries that can lead to irritation, blood in the eye, or swelling of blood vessels⁵. Allergic conjunctivitis was the most common diagnosis (35%), followed by dry eye (25%) and bacterial conjunctivitis (24%) in a study done in Eastern Europe and the Middle East on the differential diagnosis of red eye in 2006². The major causes of red

eye were due to ocular allergy 1,288 (49.1%), microbial conjunctivitis 293 (11.2%), and ocular trauma 286 (10.9%) in Nigeria³. In 2004, the common causes of acute red eye in Ghana were conjunctivitis, trachoma, corneal ulcer, acute iritis, acute glaucoma, injury (or trauma) and use of harmful traditional medicines for other eye conditions⁴.

While the more serious causes of red eye need prompt recognition and management by an eye specialist, in many cases red eye can be managed at the first point of health care (primary level)⁶. Primary care physicians often effectively manage red eye, although knowing when to refer patients to an ophthalmologist is crucial⁷. If primary health care workers are able to differentiate the various causes of red eye and provide primary level treatment, patients would be managed quicker at all levels and tertiary centres would also be relieved of treating simple conditions⁶. This would enable more time and resources to be allocated to eye conditions that need the attention of specialists in tertiary centres thereby improving quality and standards of eye care at all levels. Notwithstanding, studies on red eyes are scarce in our setting. This study was done to determine the epidemiological characteristics and aetiology of red eyes in Tamale Teaching Hospital, Ghana.

MATERIALS AND METHODS

Study design and setting: This study was a retrospective hospital-based case series. The study population included all new patients who attended the Tamale Teaching Hospital (TTH) Eye Clinic on out-patient basis or admitted at TTH eye ward during the study period. The study setting is a teaching and referral hospital located in Tamale, Ghana. Tamale is about 500km north of Accra, Ghana's capital city.

Data collection procedure: Data was collected by liaising with the medical information/record officers working at the records office. All new patients with a red eye from 1st January to 31st December 2010 were included. The patients' numbers were obtained from the out-patient attendance record and the in-patient record book in the clinic and the ward, respectively. This information was then used to retrieve all new patients' files at the medical information and records department. Patients with missing files/folders were excluded. The relevant data such as epidemiological characteristics and diagnosis were reviewed, collected and entered into a structured questionnaire. Any additional information or clarification was obtained from the medical staff where necessary.

Data management: Each questionnaire had a serial number which was the unique key identifier variable and each patient's medical record/file was linked to this serial number. A separate code book was used to store this information including the out-patient and in-patient numbers. Each questionnaire was cross checked for completeness after data collection for each day. The original medical record was used to fill in missing blanks. Data was validated prior to entry. Double entry of questionnaire into computer's Microsoft Excel data base 2010 was done to reduce errors.

Statistical analysis: The data was then exported into STATA version 12 (Stata Corp, College Station, Texas). Descriptive analysis was done to determine the frequencies and proportions for the various variables (continuous/categorical) and presented in figures or tables where appropriate. Fisher's exact test and Chi-square test for trend were used to test for associations among categorical variables. A p-value of less than 0.05 was considered significant in all statistical analysis.

RESULTS

A total of 2,027 new patients with various eye diseases attended the Tamale Teaching Hospital (TTH) Eye Clinic during the study period. One thousand nine hundred and twenty four files/folders were analyzed. One hundred and three files/folders were missing and thus were excluded from the study. A data collection flow chart is illustrated in Figure 1. Approximately 47% of new patients presenting to the eye clinic had a red eye as illustrated in Figure 1.

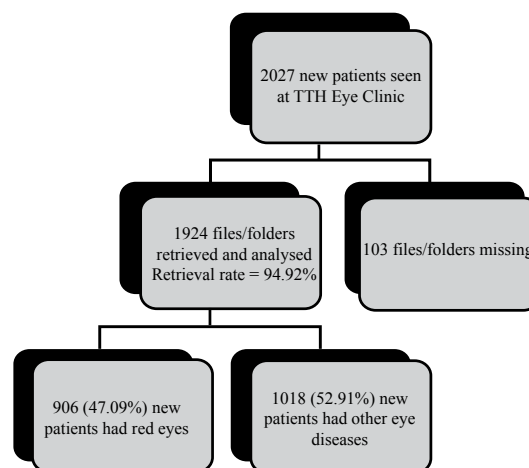


Figure 1: Flow chart showing data collection at TTH Eye Clinic

Table 1: Demographic characteristics of new patients with a red eye and other eye diseases attending the eye clinic

Characteristics of patients	Red eye No. (%)	Other eye diseases No. (%)
Sex		
Male	389 (42.94)	447 (43.91)
Female	508 (56.07)	566 (55.60)
Unrecorded	9 (0.99)	5 (0.49)
Total	906 (100)	1018 (100)
Age (years)		
0-9	232 (25.61)	53 (5.21)
10-19	202 (22.30)	90 (8.84)
20-29	240 (26.49)	107 (10.51)
30-39	123 (13.58)	190 (18.66)
40-49	57 (6.29)	152 (14.93)
50-59	26 (2.87)	121 (11.89)
60-69	25 (2.76)	292 (28.68)
70-79	0 (0.00)	2 (0.20)
80-89	1 (0.11)	11 (1.08)
Total	906 (100)	1018 (100)
Occupation		
Child/student	521 (57.51)	198 (19.45)
Farmer	53 (5.85)	61 (5.99)
Manual	158 (17.44)	225 (22.10)
Professional	75 (8.28)	159 (15.62)
Unemployed	47 (5.19)	91 (8.94)
Retired	11 (1.21)	239 (23.48)
Unrecorded	41 (4.53)	45 (4.42)
Total	906 (100)	1018 (100)

The male to female ratio for patients with red eyes was 1:1.3. There was no statistically significant ($p=0.75$) difference between males and females among new patients who presented with a red eye and those who presented with other eye disease in this study. The red eye was most common among the 20-29 year age group.

Six hundred and seventy four (74.40%) were below the age of 30 years. Approximately 58% were children and/or students ($p<0.00$) as shown in Table 1.

Table 2: Distribution of patients by eye disease presenting with a red eye

Eye disease presenting with red eye	No. (%)
Conjunctivitis	437 (48.23)
Ocular trauma	361 (39.85)
Infective keratitis/corneal ulcer	54 (5.96)
Uveitis	31(3.42)
Scleritis	10(1.10)
Endophthalmitis	8(0.88)
Acute angle-closure glaucoma	2(0.22)
Herpes zoster ophthalmicus	2 (0.22)
Panophthalmitis	1 (0.11)
Total	906(100)

The top 5 eye diseases that accounted for the red eye in this study were conjunctivitis, ocular trauma, infective keratitis/corneal ulcer, uveitis and scleritis as illustrated in Table 2.

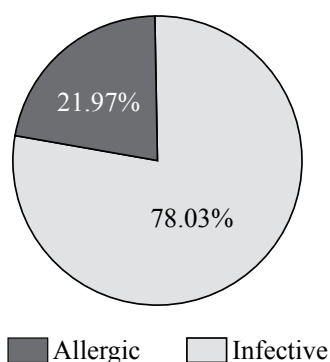


Figure 2: Distribution of patients by type of conjunctivitis (n=437)

Allergic conjunctivitis was the commonest (n=341) cause of conjunctivitis as shown in Figure 2. Males were 154(45.16%) and females 187(54.84%) with a sex ratio of 1:1.2 ($p=0.41$). Two hundred and ninety four (86.22%) were children and/or students ($p<0.00$) and the majority, 121(35.48%), were in the 10 – 19 year age group ($p<0.00$). Mild blunt trauma was the most common (n=273) category of ocular trauma as shown in Figure 3.

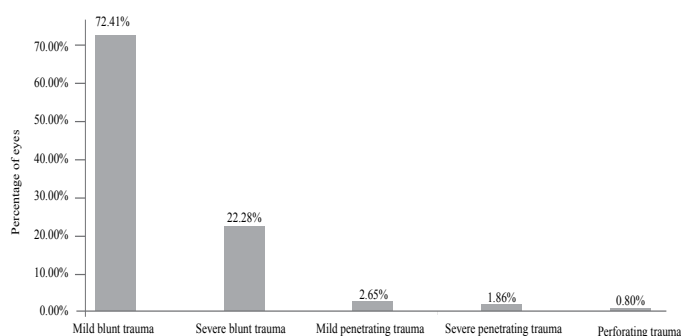


Figure 3: Distribution of eyes by category of ocular trauma (n=377)

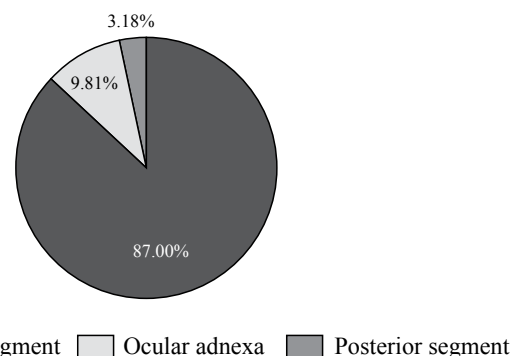


Figure 4: Distribution of eyes with ocular trauma by adnexa, anterior and posterior segment involvement (n=377)

The anterior segment was the most common (n=328) part of the eye involved in ocular trauma as illustrated in Figure 4.

DISCUSSION

Nine hundred and six (47.09%) new patients who presented to the eye clinic had a red eye in our study. This is consistent with a previous study done in the Bawku Hospital Eye Unit, Ghana, where red eyes represented over 40% of the total number of patients screened⁴. Also, in a tertiary eye clinic in Nigeria, 57.6% of patients presented to the eye clinic because of red eyes³. However, the proportion of patients with red eye was rather lower in other studies. In a teaching hospital in Nigeria, 4,723 new patients were seen in the eye clinic and 693 patients (14.8%) had red eyes⁸ and in a survey of medical practitioners from Eastern Europe and the Middle East, red eyes accounted for approximately 15% of consultations with ophthalmologists². The higher proportion of red eye in our study may be partly due to the few primary and secondary level eye health care personnel and scarce specialists who are only stationed at the study facility.

The male to female ratio for new patients with red eyes was 1:1.3. There was no statistically significant differences ($p=0.75$) between males and females among new patients who presented with a red eye and those who presented with other eye disease in this study. This is consistent with other studies where 356 males and 337 females (M:F= 1.1:1) were seen with red eyes⁸. However, a study done on the epidemiology and symptoms of red eyes in patients from Northern Iran revealed a preponderance of males (62.5%) over females (37.5%)⁷.

The red eye was most common, 240 (26.49%), among the 20-29 year age group closely followed by the 0-9 year age group, 232 (25.61%) and the 10-19 year age group 202 (22.30%). Six hundred and seventy four (74.40%) new patients with red eyes in our study were below the age of 30 years. In other studies; the majority of patients were within the age group 0-15 years (39.6%) followed by the age group 16-31 years (32.8%)³ and 63% of the

patients with a red eye were below the age of 20 years⁸. Five hundred and twenty one (57.51%) patients with red eyes were children and/or students. This is consistent with a study done on the pattern of red eye in a tertiary eye clinic, where the majority, 50.09%, were preschool children and students³.

The top 5 eye diseases that accounted for the red eye in this study were conjunctivitis, 437 (48.23%); ocular trauma, 361 (39.85%); infective keratitis/corneal ulcer, 54 (5.96%); uveitis, 31 (3.42%) and scleritis, 10 (1.10%). In other studies, the major causes of red eye were due to ocular allergy 1,288 (49.1%), microbial conjunctivitis 293 (11.2%), and ocular trauma 286 (10.9%)³ and in a teaching hospital in Nigeria, the common cause of the red eye was allergic conjunctivitis in 40% of the patients⁸. Also, allergic conjunctivitis was the most common diagnosis (35%), followed by dry eye (25%) and bacterial conjunctivitis (24%) in a study done in Eastern Europe and the Middle East on the differential diagnosis of red eye².

Conjunctivitis included both allergic, 341 (78.03%) and infective, 96 (21.97%) causes. Fasasi *et al*⁹ found that of 200 patients that presented with conjunctivitis, 163 (82%) patients were due to allergic conjunctivitis. This is consistent with our study. Among patients with allergic conjunctivitis males were 154 (45.16%) and females 187 (54.84%) with a sex ratio of 1:1.2 ($p=0.41$). This agrees with a hospital-based retrospective study of new patients with allergic conjunctivitis in Jos-Nigeria, where 474 (48.8%) males and 498 (51.2%) females with M:F ratio of 1:1.05¹⁰ and with a study done on allergic conjunctivitis in a tertiary eye hospital were 80 males and 83 females were affected⁹.

In terms of occupation, 294 (86.22%) were children and students. The majority, 121 (35.48%) were in the 10 – 19 year age group. In Nigeria, allergic conjunctivitis was more prevalent in those aged 1–16 years, 38.4%¹⁰. In another study, majority (43.6%) of the patients were within the age groups of 17–33 years, followed by 0–16 years (42.3%)⁹.

Mild blunt trauma was the most common, 273 (72.41%), category of ocular trauma that caused a red eye in this study. Bonsaana *et al*¹¹ reported that majority of ocular trauma patients presented with minor injuries which healed without complications. In contrast to our study, Rafindadi *et al*¹², found that 49.3% of patients had mild blunt trauma in their study. The high cases of mild blunt trauma in our study may be partly a reflection of the very few ophthalmic health care providers at all levels of care who are only stationed in the hospital where the study was done. This situation was vindicated in a related study in Ghana where approximately 68% of ocular trauma patients were seen at a teaching and referral hospital without a referral¹¹. The anterior segment was the most common, 328 (87%), part of the eye involved in ocular trauma in our study. This is consistent with a

study done in Ethiopia in which the anterior segment was involved in 80% of the cases¹³ and in India¹⁴ where majority of the patients presented with only anterior segment involvement (86.67%). This may be due to the fact that the anterior segment is the most exposed part of the eye to the external environment and thus vulnerable to external insults.

CONCLUSION

Red eyes accounted for approximately 47% of all new patients seen with equal male to female ratio and the peak incidence occurred in children and /or students. The top 5 eye diseases that accounted for the red eye in this study were conjunctivitis, ocular trauma, infective keratitis/corneal ulcer, uveitis, and scleritis. Most causes of the red eye were in the majority of cases avoidable, preventable and treatable.

LIMITATIONS

This was a single hospital-based study and may not be a true representative of what pertains in the general population. The inherent nature of retrospective study might have affected the distribution of cases in this study.

Disclosures: The authors have no actual or potential conflict of interest in relation to this research work.

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