

One year in an eye casualty clinic

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SUMMARY A survey of patients visiting the eye casualty clinic of the Leicester Royal Infirmary was conducted during a one-year period. Demographic and clinical data were collected for 6576 patients. Data were recorded by both medical and clerical personnel during each patient visit. In addition to reporting the main demographic variables in the study, the most common diagnoses and occupations were analysed separately. The main diagnoses fell into two groups: trauma and acute infection/inflammation. The frequency of eye trauma in males was twice that in females. Trauma in adults was strongly influenced by occupation. Common occupations presenting with eye injury were press and machine tool operators, motor vehicle and aircraft mechanics, metal and sheet metal workers, construction and general labourers, electricians, welders, bus/lorry drivers and painter/decorators. Infections were in general distributed evenly throughout the population. The most common infection reported was acute conjunctivitis.

The cost to society of acute eye disease has led to increasing interest in the distribution of these diseases. Particular emphasis has been placed on eye trauma. Several studies have addressed the problem of eye trauma in the community¹⁻⁵ and in children in particular.⁶⁻⁸ These studies generally included data which was collected from hospital records and whose focus was on severe injury. Surveys of ocular presentations of small numbers of patients to general emergency departments have also been conducted.^{9,10} In most reports of eye casualty problems attention is generally directed towards management rather than occurrence of disease. In order to survey the broad range of eye casualty problems that require medical attention we initiated a project to evaluate an eye casualty clinic which is part of a general health care system serving a large community.

The study took place at the Eye Clinic of the Leicester Royal Infirmary (LRI), which has the only ophthalmology service in the Leicestershire Health Authority (LHA) and hence has a unique catchment population of eye disease. Of the approximately 835 000 inhabitants served by the Leicestershire Health Authority about 42% live in and around the city of Leicester. The eye casualty clinic is located within the general eye clinic and is the only eye casualty unit in the LHA.

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In this paper we present summary statistics for several demographic and clinical variables of eye casualty patients seen at the LRI during a one-year period. We then looked further at the eye disease observed in the main occupational groups.

Materials and Methods

Data were obtained for 6987 patients visiting the eye casualty clinic of the LRI between 1 September 1981 and 31 August 1982. A set of variables which encompassed both demographic and clinical data was collected at each patient's initial visit to the clinic. Variables included the following: hospital record number, visit date, consultant ophthalmologist, postal code, date of birth, country of birth, occupation (industry), ethnic group, religion, source of referral, diagnoses, and disposal. Data from return visits included the hospital record number, visit date, diagnoses, and disposal. Records for 6% of the patients (n=411) lacked all demographic data. The first visit for these patients had been recorded as a return visit, and return visit forms lacked the necessary demographic data. These patients were dropped from the study. The number of patients therefore remaining in the study was 6576.

The variables were categorised as follows. Diagnostic codes followed the International Classification of Diseases, 9th revision.¹¹ Classification of occupations followed that compiled by the Office of

Population Censuses and Surveys¹² with the following additions: housewife, handicapped or disabled, child not in school, schoolchild, and student. The referrals used in this report were general practitioner, self-referral, general emergency department, and all others. The last category included optician directly, other specialty clinic, community medical officer, and outside referrals such as the Blind Society. Disposals were as follows: return to casualty clinic, admit to eye ward, admit to other ward, day care admission, surgical waiting list, refer to other consultant, blind registration, and discharge. 'Ethnic origins' were designated as Caucasian (Western), Indian/Pakistani, Negro, Oriental, and other. Religions were Christian, Jewish, Hindu, Moslem, Sikh, and other.

The data were first recorded on specially prepared patient visit forms which were filled out by the medical and clerical personnel during each visit. The data were then coded by a technician for input into the computer. The coded data were transferred to magnetic tape at the University of Leicester Computer Laboratory. The data tapes were analysed on the IBM 3081 computer at the Information Technology Service at Stanford University. By means of a program developed within the statistical package, Statistical Analysis System [SAS], the visit records were reorganised into patient records which included a summary of the data from the set of visit records for each patient (Chiapella AP, in preparation).

Out-of-range values in the data for these patients were either corrected or excluded from the statistical analyses. No more than 25 were found for any one

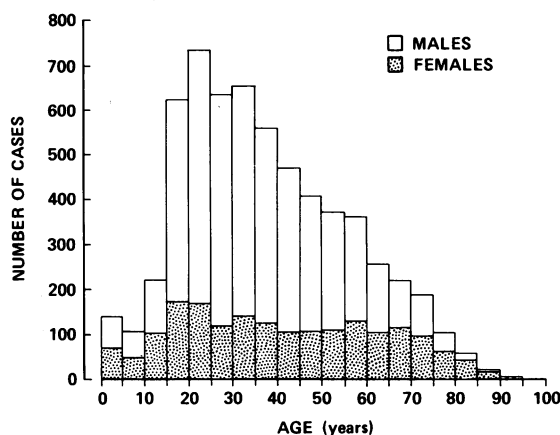


Fig. 1 Age of casualty clinic patients. The age distribution of the patients is subdivided by sex.

variable and most variables had fewer than 10. The set of patient records was then analysed by procedures provided in SAS.

Results

DEMOGRAPHIC VARIABLES

Sex. 29% of the patients were female and 71% male.

Age. The median patient age was 23 years. The ages of the patients, subdivided by sex, are shown in Fig. 1.

Country of birth. 85% of the patients were born in England, 3.5% in India, 1.5% in Northern Ireland, 1.4% in Kenya, 1.3% in Scotland, 0.9% in Uganda, 0.9% in Great Britain (unspecified), 0.5% in Africa (unspecified), and <0.5% from any other country.

Table 1 Most common occupations of patients attending the clinic*

Occupation	Cases	Median age	Sex† (F/M)	Referral‡ (GP/self/other)	Main diagnosis groups‡ (ker[1]/acute conj[2]/lid inflam[3]/injury[4])
Press, machine toolsetter, operator	650	36	1/99	12/76/12	6/9/3/76
Schoolchild	412	13	35/65	40/45/15	6/19/13/50
Housewife	304	49	100/0	65/29/6	12/17/8/17
Clerk	222	41	64/36	45/44/11	8/27/11/29
Textile worker	205	46	61/39	45/40/15	13/20/7/29
Metal worker, machinist	189	33	1/99	12/71/17	4/8/4/77
Motor vehicle, aircraft mechanic	190	28	1/99	9/74/17	7/9/5/77
Construction	179	34	1/99	15/70/15	6/10/6/73
General labourer	168	39	2/98	15/59/26	8/10/4/71
Sheet metal worker	148	29	0/100	7/82/11	6/10/1/83
Electrician	130	32	1/99	12/72/16	7/9/3/80
Distribution manager	124	42	12/88	23/58/19	13/10/7/48
Bus, coach, lorry driver	123	38	5/95	26/62/12	7/13/7/72
Welder	116	38	3/97	9/82/9	6/5/3/84
Student	110	20	40/60	35/52/13	10/14/10/38
Child, not in school	103	2	50/50	40/42/18	2/35/16/39

*Includes 100 or more patients. †Percentage of patients.

‡Percentage of patients in this occupation carrying the following diagnoses: [1] Keratitis. [2] Acute conjunctivitis. [3] Inflammation of the eyelids. [4] Injury.

Ethnic background. 90.3% were Caucasian (Western), 8.0% Indian or Pakistani, 1.3% black or African, 0.4% other.

Religion. 83.6% were Christian, 4.7% Hindu, 1.8% Sikh, 1.2% Moslem, and 8.7% other or unspecified.

Occupation. Sixteen occupations included 100 or more patients. The median age, sex ratio, source of referral, and main diagnoses for patients in these occupations are summarised in Table 1.

Postal code. Our data, which included patients' postal codes, are compared with catchment population data provided by the LHA. A map of the catchment area of the LHA is provided in Fig. 2. Postal codes LE1-LE5 (mainly the city of Leicester and nearby suburbs) provided 55% of the patients, LE6-LE9 (suburban areas) provided 32% of the patients, LE10-LE17 (the most outlying areas of the county) 10%, and the non-LE postal code areas less than 3% of the patients. The population data show that 41.6% of the resident population live in LE1-LE5, 26.6% in LE6-LE9 and LE10-LE17, and 5.2% live in non-LE postal code areas. It is therefore clear that the population in and around the city of Leicester utilises the casualty clinic considerably more than the population from outlying areas.

CLINICAL VARIABLES

Source of referral. 56% were self-referred, 30% were referred by the general practitioner, 8.6% came from the general emergency department, 1.3% from other specialty clinic (not LRI), 1.0% from their optician

directly, 0.8% from the specialty clinic in the LRI, 0.2% were referred by community or school medical officer, and 2.1% came from all other sources.

Number of visits. 79% of the patients came for one visit to the casualty clinic, 15% for two visits, and 6% for more than two visits. Usually after three to four visits the patient was then discharged or referred to the general eye clinic.

Disposal. 78% were discharged, 32% were referred to the general eye clinic, 2% admitted to eye ward, 1% put on waiting list (for surgery), 0.7% referred to other consultants, and 0.2% were allotted to all the other disposals. This adds up to over 100%, since some of the patients contributed more than one disposition. Most of these were patients who, after discharge, returned to the casualty clinic and were then referred to the general eye clinic.

Diagnostic categories. The main diagnoses seen at the casualty clinic fell into two general categories: trauma and acute infection/inflammation. As a group, the patients in each of these categories differed from those in the other category with respect to several characteristics. An analysis of these patient groups is presented below.

Trauma was the leading cause of patient presentation to this casualty clinic, accounting for 52% of the patients attending. The main problems included in this group were corneal abrasion, foreign body on external eye, contusion of eye and adnexa, and burn confined to eye and adnexa. In the age range 5-15 years boys presented with eye trauma twice as often as girls. The patients above age 15 were mainly men,

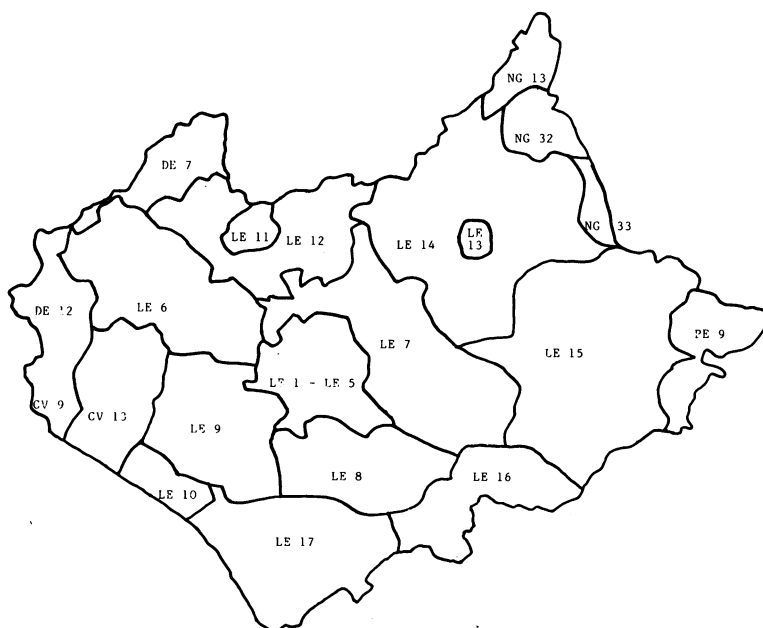


Fig. 2 Map of catchment area of Leicestershire Health Authority showing postal codes.

and in these patients the injuries were highly influenced by occupation. Over 70% of the patients with a diagnosis of trauma were self-referred. Table 2 presents a summary of the age, sex, and source of referral for the four most common trauma diagnoses. The majority of the patients with eye trauma came from relatively few occupations. We have identified 11 common occupations in which the risk of eye injury was high. 50% of the injury cases came from these 11 occupations, while only 35% of the casualty clinic patients fell into these occupational groups. For patients in these occupations the ratios of accidents to other eye casualty problems was much higher than those found in the remainder of the occupational groups. Table 3 summarises the types of injuries for patients in these 11 occupations.

The second most common diagnostic group into which the eye casualty patients fell was infection/inflammation, and it accounted for 29% of the patients attending. The male/female ratio in the various diagnoses included in this group ranged from 0.6 to 2.0. There were many more referrals by general practitioners for this group of patients than for the trauma patients. However, there is considerable variation between diagnoses. Those diagnoses which were mainly general practitioner referrals were keratitis, chalazion, herpes zoster ophthal-

micus, and iridocyclitis. Those which were mainly self-referrals were superficial keratitis and conjunctival vascular disorders, for example subconjunctival haemorrhage. Those balanced between self-referral and general practitioner referral were scleritis/episcleritis, corneal ulcer, acute conjunctivitis, deep inflammation of eyelid, entropion and trichiasis of eyelid, blepharitis, and keratoconjunctivitis. A summary of these findings is presented in Table 4.

Discussion

The main source of emergency ophthalmic care for the population of Leicestershire is the eye casualty clinic located within the general eye clinic of the Leicester Royal Infirmary. This situation provided a unique opportunity to survey eye casualty problems in this diverse population for a one-year period.

On a per capita basis the inhabitants of Leicester utilised the casualty clinic more heavily than people living in outlying areas. There are several possible causes for this finding. (a) Drift to clinics located outside Leicestershire undoubtedly occurs from the outlying areas. (b) General practitioners working at great distances from the LRI may be more likely to treat rather than refer their patients. (c) Fewer prob-

Table 2 Trauma patients

Injury	Cases	Median age	Sex* (F/M)	Source of referral* (GP/self/gen. casualty clinic/other)
Corneal abrasion	849	32	22/78	12/68/16/4
Foreign body	2106	32	8/92	7/80/9/4
Contusion	214	24	23/77	19/60/15/6
Burn	240	27	21/79	5/73/12/10

*Percentage of patients

Table 3 Occupations presenting with eye injury

Occupation	Number of cases				
	All injuries	Burn	Contusion	Foreign body	Corneal abrasion
Press, machine tool operators	494	13	13	425	64
Motor vehicle, aircraft mechanic	147	10	7	111	18
Metal worker	145	7	4	111	27
Construction	131	16	6	82	37
Sheet metal worker	124	3	3	108	12
Electrician	104	5	3	77	24
General labourer	120	6	5	79	34
Welder	97	9	3	72	18
Bus, coach, lorry driver	76	4	5	46	23
Others in processing	51	4	1	23	8
Painter and decorator	44	7	1	23	17

Note that the sum of cases in the four injury diagnoses may be more than 'all injury' cases. This is because a few patients had more than one diagnosis.

Table 4 Acute infection and inflammation: summary of most common diagnoses*

Diagnosis	Cases	Median age	Sex† (F/M)	Referral† (self/GP/other)
Acute conjunctivitis	626	33	44/56	38/50/12
Chalazion	246	33	52/48	65/28/7
Acute/subacute iridocyclitis	183	49	43/57	68/22/10
Corneal ulcer	140	45	33/67	53/38/9
Scleritis and episcleritis	122	34	53/47	53/36/11
Conjunctival vascular disorders	115	46	39/61	24/61/15
Superficial keratitis without conjunctivitis	100	30	38/62	31/55/14
Hordeolum and other deep inflammation of eyelid	82	30	43/57	46/41/13
Herpes zoster with ophthalmic complications	73	67	55/45	85/13/2
Interstitial and deep keratitis	65	47	42/58	56/26/18
Other and unspecified keratoconjunctivitis	66	55	61/39	60/26/14
Entropion and trichiasis of eyelid	60	45	44/56	44/45/11
Blepharitis	57	39	52/48	50/43/7

*Cases with trauma have been deleted from this Table.

†Percentage of patients.

lems, especially injury, may occur in rural areas. (d) The different distribution of occupations between city and rural areas may account for these differences. (e) Finally, attitudes held by people in these areas may lead to differences in utilisation of medical resources. Patients in rural areas may not wish to come into Leicester because of the inconvenience, loss of earning, difficulty in transport, and also because they may have a much higher threshold before they seek professional medical help.

A typical patient coming to the eye casualty clinic during the study year was a man of working age with an eye injury. He was self-referred and came for one visit only. He was likely to be in one of several occupations which appeared to be at risk for eye injury. Although data are not available on the incidence of injury at work versus that outside work, it seems reasonable to assume that most of the injuries occurred at work, since the patients presented to the eye casualty clinic during normal working hours. This presumed high rate of job-related injuries would indicate that these workers are not being adequately protected by eye shielding devices. This could be due to inadequate devices, a lack in supplying of devices, and/or the improper use of devices when provided. The second possibility is that these workers, when not at work, sustain injuries more often than others. They may involve themselves in more risky activities, such as sports or motor car and house repair. Identifying the specific causes of the high rate of injuries deserves further attention.

In this study boys presented with eye injury twice as often as girls. This finding is in the same direction as those presented by other investigators for injuries in children.⁵⁻⁸ The ratio, 2:1, is lower than that noted by other authors, who have reported ratios of 3:1 and higher.⁵⁻⁸ In contrast to the other studies the patients in our study were not admitted to hospital. This may

indicate that the ratio of eye injury in boys versus girls may be smaller for less severe injury than for those injuries requiring admission to hospital.

Although this study has concentrated mainly on summarising data on the patients attending the eye casualty clinic over a one-year period, it has raised the possibility of providing further epidemiological information, especially with regard to occupations at risk for specific ocular injury and the possibility of seasonal variation in emergency ophthalmological disease.

The collection of data is continuing, analysis of which should throw better light on utilisation of ophthalmic emergency facilities by this population.

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References

- 1 Canavan YM, O'Flaherty MJ, Archer DB, Elwood JH. A 10-year survey of eye injuries in Northern Ireland, 1967-76. *Br J Ophthalmol* 1980; **64**: 618-25.
- 2 Chapman-Smith JS. Eye injuries: a twelve-month survey. *NZ Med J* 1979; **90**: 47-9.
- 3 Garrow A. A statistical enquiry into 1000 cases of eye injuries. *Br J Ophthalmol* 1923; **7**: 65-80.
- 4 Ilsar M, Chirambo M, Belkin M. Ocular injuries in Malawi. *Br J Ophthalmol* 1982; **66**: 145-8.
- 5 Maltzman BA, Pruzon H, Mund ML. A survey of ocular trauma. *Surv Ophthalmol* 1976; **21**: 285-90.
- 6 Grignolo FM, Biovencal R, Lorenzi U, Lombardo L. Epidemiology of eye injuries in children under 16 years of age. *Minerva Pediatr* 1983; **35**: 747-52.
- 7 Lambah P. Some common causes of eye injury in the young. *Lancet* 1962; **ii**: 1351-3.

- 8 Niiranes M, Raivio I. Eye injuries in children. *Br J Ophthalmol* 1981; **65**: 436–8.
- 9 Hay SH. Ocular presentations in the emergency department. *J Med Assoc State Ala* 1977; **47**: 23–4.
- 10 Olesen JM. Eye problems in an emergency department. *Ugeskr Laeger* 1983; **145**: 2051–3.
- 11 World Health Organisation. *International classification of diseases, revision*. Ann Arbor: Commission of Professional and Hospital Activities, 1980.
- 12 Office of Population Censuses and Surveys. *Classification of occupations*. London: Her Majesty's Stationery Office, 1980.