



Research Article

Changing Patterns of Eye Casualty Presentations over a 24 Year Period

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Published: November 30, 2015

Abstract:

Background: Advancements in Ophthalmology over the last 30 years has led to marked changes in ophthalmic practice. In this study we aim to identify any changes in case mix and volume in a specialist Ophthalmology Accident and Emergency department by comparing attendances 24 years apart.

Methods: A retrospective analysis of 675 consecutive emergency patient attendances at the Sussex Eye Hospital, Brighton, UK was conducted, comparing data from 1987 and 2011.

Results: A statistically significant ($p < 0.05$) increase was noted in patients presenting with non-penetrating trauma, inflammatory conditions, lacrimal disorders, Posterior Vitreous Detachment (PVD) and benign floaters, post ophthalmic procedure and other diagnoses. A statistically significant rise in the average number of patients seen per day, from 22.1 to 35.3 ($p < 0.05$) was also found. Correspondence regarding the patient visit was more likely to be sent to the patient's general practitioner in 2011.

Conclusions: A significant rise in the rate of attendances and marked shift in diagnoses was observed over the 24 year period. This data highlights the increasing need for specialist ophthalmic emergency care and can be utilized to determine future workforce planning and allocation of resources. (185)

Introduction: In the UK, emergency specialist eye care is mostly provided for by ophthalmologists working in general Accident and Emergency departments. Patients are usually referred from General Practitioners, community optometrists or ward based doctors, for inpatients. Dedicated Eye Hospitals where patients could seek help without referral were commonplace, but the availability of these has declined in recent years

Over the past three decades there have been marked changes in many aspects of ophthalmic practice. The increased range of surgical and medical interventions, especially the advent of new treatments such as anti-VEGF (Vascular Endothelial Growth Factor) therapy for Wet Age Related Macular Degeneration (AMD) has created new subsets of patients who are being investigated further and offered more treatments than ever before. Improving technology and more predictable outcomes following operations such as phacoemulsification cataract extraction, has increased surgical throughput and post-operative reviews are increasingly performed in nurse led clinics [1]. Furthermore, with the advent of the internet, patients are now better informed and seek medical help more readily.

The Sussex Eye Hospital, situated in Brighton, East Sussex, UK is a dedicated eye hospital, which serves a mixed urban and rural population of approximately 500,000 patients. It provides a 24 hour walk-in eye accident and emergency service for the general public, meaning formal referral from a health professional is not required.

In 1983, Jones *et al.* retrospectively reviewed the diagnosis of patients attending the casualty department of Southampton Eye Hospital [2]. More recently much has been published on surveys of clinical presentations, demographics and appropriateness of casualty attendances [3,4]. Studies have also considered the role of emergency ophthalmic nurse practitioners [5] and the need for a 24h ophthalmology walk-in service [6]. More recently, Smith *et al.* conducted a survey of managers responsible for London's out of hour's eye casualty service and discussed methods to increase capacity and efficiency in response to perceived changes in demand on out of hour's ophthalmology services [7]. However, changes in case-mix and volume of emergency ophthalmic complaints over a given period of time have never been reviewed.

This retrospective study was performed to identify any changes in case mix and volume in a specialist ophthalmology Accident and Emergency department, comparing 1987 to 2011.

These parameters provide greater insight into whether new trends in ophthalmic practice have affected the role of and utilisation of a specialist Ophthalmic Accident and Emergency department. We postulate that any changes found would be of use to facilitate workforce planning within ophthalmology departments and strategic planning of eye emergency access.

Materials and Methods: A retrospective analysis of consecutive emergency patient attendances at the Sussex Eye Hospital was conducted using data from 1987 and 2011. For 1987 data 675 consecutive attendances were analysed using paper records, from the 9th February 1987. A further 675 attendances were analysed from 6th February 2011, from data recorded on Ascribe Symphony, an electronic patient record system used to track patient flow through the department.

For each attendance the following data was collected:

- Diagnosis (grouped into categories used in a similar survey by Vernon in 1983 [4])
- Age
- Gender
- If a hospital number was allocated
- If the General Practitioner (GP) was sent any correspondence following the attendance

The data was analysed for statistical significance using the two-proportion test for variations between the 1987 cohort and the 2011 cohort. Furthermore, a daily rate of attendance was also calculated.

Results: In both the 2011 and 1987 cohorts, the median age range was 41 to 60. However, significantly more patients in the 19 – 30 age group presented in 1987 and significantly more patients in the 41-60 age group presented in 2011 (Table 1).

Ages	1987	2011	pvalue
0 - 18	69	54	0.156
19 - 30	153	86	<0.001
31 - 40	100	88	0.3455
41 - 60	144	197	0.009
61 - 80	165	210	0.0062
80 +	26	40	0.0772
Not documented	18	0	<0.001
TOTAL	675	675	

Table 1: Breakdown of Ages. P Values Provided as Ascertained By the Two-Proportion Test

Rate of Attendance: In 1987, 675 consecutive patients were seen in 30 days, with a mean of 22.1 patients per day. In 2011, the same numbers of patients were seen in 19 days, with a mean of 35.3 patients per day, 59.7% more. This was a statistically significant increase in the rate of attendance ($p < 0.001$)

Diagnosis of Attendances: Table 2 shows the comparison of the number of each diagnosis made between 2011 and 1987. A statistically significant increase was noted in the number of presentations in 6 out of the 19 diagnostic categories. These included: non-penetrating trauma, inflammatory conditions, lacrimal disorders, PVD and benign floaters, post ophthalmic procedure and other diagnoses. An increase in the number of contact lens related conditions seen by the emergency ophthalmology service was noted, but this did not quite reach statistical significance ($p = 0.075$.)

Diagnosis	1987	2011	p value
Inflammatory Conditions	213	172	0.016
Non-Penetrating Trauma	195	149	0.01
Other	87	61	0.03
No cause found	42	57	0.14
PVD and benign floaters	12	52	<0.01
Lacrimal disorders	13	28	0.02
Lid Lumps (eg. Chalazion, etc)	26	28	0.9
Post Procedure	5	21	<0.01
Contact Lens related	8	18	0.07
Neurological conditions	15	17	0.86
Retinal and Vitreal Hemorrhage	15	17	0.86
Chemical Injury	18	17	1
Headache	4	9	0.26
Raised IOP	5	7	0.77
Retinal Detachment	2	7	0.18
Retinal tears	3	7	0.03
Macula Pathologies	11	7	0.48
Neoplasia	0	1	1
Penetrating Trauma	1	0	1
Total	675	675	

Table 2: Comparison of the Number of Each Diagnosis and P Value of the Difference as Ascertained By the Two-Proportion Test

Documentation: In 1987 there was no documentation suggesting that a GP letter had been written, whereas in 2011, through the use of an electronic patient record all patients automatically had a GP letter produced from their visit. As a result in 2011 there was a significant increase in the number of patients whose GP received a letter following their visit to the emergency ophthalmology department.

Furthermore there was a statistically significant increase in the number of patients who were formally registered to the hospital following their attendance (Table 3.)

	1987	2011	p value
GP Letter produced	113	675	<0.01
Hosp. No. Allocated	28	675	<0.01

Table 3: A Comparison of the Number of Patients That Had a GP Letter Produced from Their Ophthalmic AnE Visit and the Number of Patients Who Were Allocated A Hospital Number. P Values Provided As Ascertained By the Two-Proportion Test.

Discussion: In this retrospective study we found interesting changes in diagnoses presenting to the modern day ophthalmic department and an overall increase in attendances of almost 60%

A statistically significant increase ($p < 0.05$) was noted in the number of patients presenting with retinal tears and posterior vitreous detachment and benign floaters. This may reflect an increase in patient awareness of the significance of symptoms such as flashing lights and floaters, with the advent of information resources such as the internet.

There were more than four times the number of presentations post ophthalmic procedures in 2011 as compared to 1987 ($p < 0.01$). This could be explained by the expansion of phacoemulsification cataract surgery and with the majority of ophthalmic surgery now available as day case operations [1]. More patients ($p = 0.02$) presented with dry eye and lacrimal disorders in 2011 as compared to 1987. This could be due to advances in the knowledge of the pathophysiology of dry eye disease and the subsequent increase in number of treatment options available for these patients [8].

It could be suggested that an aging effect over the 24 years could attribute to the statistically significant increases in posterior vitreous detachment and dry eye. However, as the median age of attendances did not change between the two cohorts it is difficult to draw this conclusion.

One would have thought with the advent of Anti-VEGF treatment for Wet AMD and a rapid access

macular clinic available for optician referrals, there would have been a statistically significant decrease in the number of patients presenting with macular pathologies, however this was not seen.

Furthermore, we noted a greater than two-fold increase in patients presenting with contact-lens related concerns, however this did not reach statistical significance. We postulate that this could be attributed to the increased availability and wear of contact lenses.

There was a statistically significant decrease in the number of patients presenting in 2011 with non-penetrating trauma ($p = 0.005$) and inflammatory conditions ($p = 0.02$.) In the case of trauma, this may reflect greater awareness of workplace hazards to the eye and greater use of eye protection in work and sports. A number of studies have looked at different ways of improving care in accident and emergency departments [9] across the UK and this has lead to an increased use of emergency nurse practitioners in the management of emergency ophthalmic complaints [5], which could also explain such a decrease.

Increases were noted in the number of patients who were allocated an appropriate hospital number ($p < 0.01$) and those for whom a GP letter was produced ($p < 0.01$). This was attributed to the use of an electronic patient record system in 2011, which facilitated the generation of GP letters.

Several issues should be considered when interpreting our results. Our study only looks at two points in time, 1987 and 2011. Had this data been collected at various time points over the 24 years greater analysis of changing trends could have been made and greater attempts could have been made to extrapolate results to predict future impacts on specialist eye departments? Furthermore, these findings are specific to the Sussex Eye Hospital; a specialist eye unit based in the South East of England and may not be representative of a national trend.

Three previous studies have looked at patterns of ophthalmic complaints in dedicated ophthalmic emergency departments [2-4] however this study is the first to analyse changes in case mix and volume in one such department over a 24 year period. Recently Smith *et al* [7] noted that Moorfields Eye Hospital, London had witnessed a considerable increase in demand, seeing attendances rise by 7.9% year-on-year. They suggested that this reflected the combined pressures of a reduced service provision by smaller units, increased demand from a growing population, and rising patient expectations in an increasingly 24 h-a-day, 7 day-a-week society.

Our study found that in accordance with this, attendances in such departments are rising and furthermore these departments are now faced with different diagnostic challenges than previously, with, for example, a fourfold increase in patients presenting following a recent ophthalmic procedures.

We demonstrate a significant rise in rate of attendance and marked shift in diagnoses facing the modern day Ophthalmic Accident and Emergency department. We postulate that these changes are due to advances in treatments and investigations available to ophthalmology patients, increased patient awareness and increased day case operations and laser procedures. These patterns furthermore reflect changes in government policy and shifting clinical demands, as exemplified by the 'NHS Plan' published in 2000, which prioritised Accident and Emergency care by increasing the resources directed towards this service and introducing the 4 hour target [10].

The observed trend of rising attendances and shift in diagnoses highlights the value and importance of accessible specialist emergency eye care. However, with the lack of dedicated eye hospitals and greater pressures being placed on emergency departments and general practices it is not clear where or how this need will be met. Our findings therefore have implications to those in charge of managing and delivering emergency ophthalmic care, who need to ensure enough resources are available to accommodate this increasing demand.

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