



Patient and clinician perspectives of ophthalmology emergency attendances during the COVID 19 pandemic

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Abstract

Introduction: To explore patient and clinician perspectives on acute ophthalmology presentations during the COVID pandemic. To ascertain whether the pandemic had differentially impacted access to care based on patient demographics and postcodes.

Methods: A single-centre, cross-sectional prospective study in a busy metropolitan eye casualty between April–June 2020 recording patient demographics, distance travelled to access healthcare, diagnosis and outcome compared to the equivalent period in 2019. A further two-part survey was conducted to explore patient and clinician's perceptions around delays in attendances, views on remote consultation and severity of the condition.

Results: There was a 68% decrease in April 2020 compared to previous year's ED attendance. The diagnosis tended towards more visually significant pathology. From 2019 to 2020, there was a significant decrease in average distance travelled to the eye emergency department (eye ED). working-age adults (18-59) and white patients travelling from very far pre-pandemic contributed most to this change. 513 Patient responses (12%) out of 4433 attendances during the study period were received, 89% (456/513) of the completed surveys also had matching clinician surveys. 29% (149/513) patients felt COVID-19 stopped them from attending earlier. Clinicians thought a video consultation would have been suitable for 40% (182/456) of patients compared to only 13% (58/456) of patients preferring a video consultation.

Discussion: Although our findings were limited by low response rates, COVID-19 may have caused a delay in presentation for emergency eye care. Demographic changes and attitudes towards video consultations have implications for planning of emergency eye care in future pandemics.

Keywords

ophthalmology, COVID-19, cross sectional study

Introduction

On the 31 January 2020 the first two cases of novel SARS Coronavirus were confirmed in the United Kingdom (UK) and the first death was confirmed on 5 March 2020.¹ On the 23 March 2020 new strict rules were announced with the British public instructed by the Government to stay at home to limit spread.² The National Health Service (NHS) had an unprecedented challenge to provide acute care for the exponential rise in COVID-19 cases requiring hospitalisation.³ Most routine surgery was deferred, and many outpatient hospital visits switched to a virtual platform.³

Ophthalmology service provision similarly saw significant shifts in service delivery in response to the pandemic across surgical and outpatient care.⁴ Prior to the pandemic, an estimated half of ophthalmic departments provided a walk-in emergency service, with the remainder having

scheduled appointments or telephone triage.⁴ An estimated half of the units were also supported by a community optometrist-led service such as Minor Eye Conditions Scheme (MECS) or Primary Eye-care Assessment and Referral Services (PEARS).⁴ During the pandemic, many major eye units in London⁵ and across the country⁶ saw significant reductions in emergency attendances.

Although there are a significant number of peer reviewed publications describing the impact of the current health

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emergency on ophthalmology practice with recommendations regarding future re-organisation,^{7,8,9,10,11,12,13} there appears to be a lack of prospective studies examining the combination of both the patient and clinician experience and perspectives in emergency ophthalmology attendances. A survey of members of the public also revealed that many saw the COVID-19 pandemic and the first lockdown as a barrier to seeking help for even urgent, sight-threatening eye conditions.¹⁴ Furthermore, evidence is now emerging that the pandemic has disproportionately impacted patients from certain minority groups, or those from socioeconomically deprived areas.¹⁵ With barriers to seeking general emergency care due to the pandemic now being associated with poorer health outcomes,¹⁶ we sought to understand and explore some of these attitudes in our patient cohort.

We aimed to first examine the attendance patterns and demographics of patients attending the eye emergency department (eye ED) over the pandemic period to determine whether the pandemic had differentially impacted access to care based on patient demographics details, and postcode-derived data for both distance to the ED and indices of deprivation. Additionally, we conducted a survey to both patients attending the department, and their attending clinicians, to ascertain whether delays in seeking care existed, and whether patients felt the pandemic led them to delay seeking care.

Methods

This is a single-centre, cross-sectional prospective study carried out at the eye ED of Imperial College Healthcare Trust. The department is a large metropolitan eye ED and is the tertiary ophthalmic referral centre for patients in Northwest London, receiving referrals from surrounding healthcare trusts and covering a population of approximately 4 million people. The study first examines year-on-year changes in emergency attendance patterns for numbers, diagnosis and demographics retrieved from anonymised electronic-health record (EHR) data before and after the pandemic.

To examine changes in attendance patterns during the pandemic, we also analysed all casualty attendance figures from the first month of lockdown in April 2020 until the easing of lockdown in late June 2020. Weekly patient eye ED attendance numbers were retrieved from the EHR (Cerner, Cerner Corporation, USA) and were compared between corresponding weeks of May and June from all of 2019 and 2020. Data collected on all patients attending the eye ED included: Ophthalmic Diagnoses, Gender, Age, Ethnicity and Post-code. Ethnic groups were as labelled on the patient's Cerner record, we grouped patients into white and non-white ethnic groups based on this data for analysis (Supplemental Figure 1). From the Postcode data we estimated the distance patients travelled to the eye ED was taken as the straight-line kilometre distance between a patient's registered address post-code and the

eye ED using an open-sourced Python framework pgeocode (<https://pypi.org/project/pgeocode/>). Post-codes were also used to retrieve English indices of deprivation data from the Gov.uk 2019 version of the tool (<https://imd-by-postcode.opendatacommunities.org/imd/2019>). Data visualization and statistical analysis was conducted using Python 3. A Shapiro-Wilk test revealed normal distributions of patient age, other variables were not normally distributed. A 2-sided independent t-test was applied to year-on-year age differences, and a 2-sided Mann-Whitney-U test applied to all other relevant variables.

All patients presenting to eye ED in the month of May and June of 2020 (1 or more months after the beginning of national lockdown) were offered an anonymous survey per to complete whilst awaiting triage and assessment. These included questions about any delay in seeking ophthalmic care, their fear of contracting COVID in a hospital setting and their receptiveness to video consultations. Following the consultation, the assessing clinician (ophthalmology doctor or advanced nurse practitioner) was asked to complete a complementary survey on the back of the patient's responses as to whether the presentation appeared to be delayed, whether urgent treatment or referral was needed, and whether the condition was sight threatening or whether the clinician deemed it suitable for a video consultation or triage.

Patients were asked the question 1) When did you first notice your eye problem? 2) Has the COVID-19 pandemic stopped you from coming to AnE earlier? 3) If yes, why are you attending now? 4) If you could have a video consultation instead of attending AnE, would you have preferred this?

Clinician Questions included 1) Does this patient's presentation appear to be delayed? 2) Did the patient require urgent treatment in casualty? 3) Did the patient require urgent referral to be seen within 2 weeks of AnE attendance? 4) Was the condition sight threatening? 5) Was the condition appropriate for a video consultation/triage?

This study was approved by the audit department of Imperial College Healthcare NHS Trust and was assigned the approval code OPH50.

Results

We had 513 Patient responses (12%) out of 4433 attendances during the study period 456 (89%) of the completed patient surveys also had matching clinician surveys. The overall survey ascertainment rate was 10%. 'Clinicians' that filled out the survey were predominantly doctors (trainees of all grades to consultants) but also included advanced nurse practitioners.

Attendance patterns

The largest drop in eye ED attendances was in the first week of April 2020. There were 240 compared to

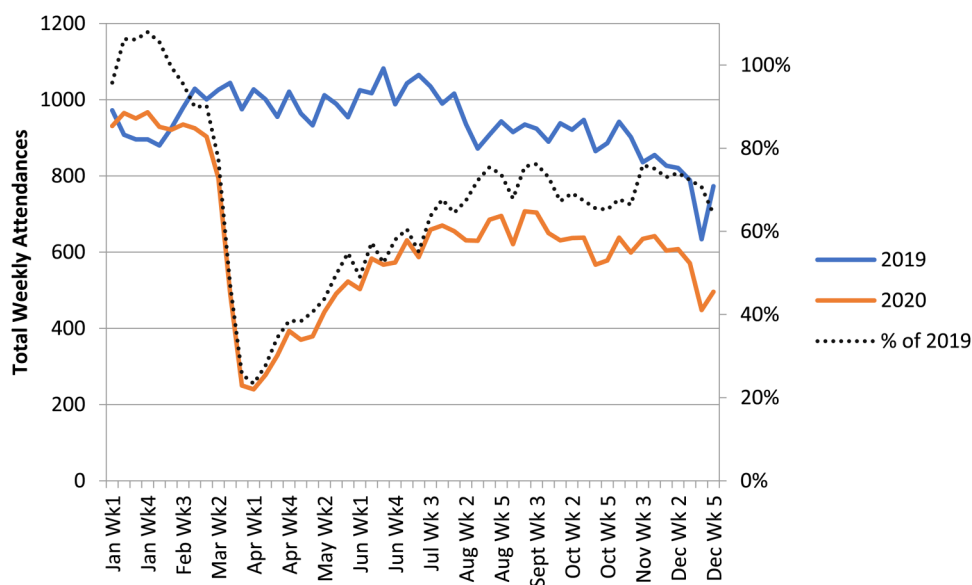


Figure 1. Weekly total eye emergency department attendances throughout 2019 and 2020. Dotted line denotes percentage 2020 of 2019 attendances.

Table 1. Top 10 AnE diagnoses by frequency in 2019 vs 2020 for May and June.

Ranking	2019 May to June			2020 May to June		
	Diagnosis	Count	(%)	Diagnosis	Count	(%)
1	Disorder of eyelid	1525	17%	Disorder of eyelid	433	10%
2	Conjunctivitis	1176	13%	Posterior Vitreous detachment	438	10%
3	Corneal abrasion	828	9%	Corneal abrasion	315	7%
4	Red eye	796	9%	Tear film insufficiency	306	7%
5	Posterior Vitreous detachment	549	6%	Conjunctivitis	274	6%
6	Tear film insufficiency	365	4%	Anterior uveitis	262	6%
7	Anterior uveitis	356	4%	Cataract	153	3%
8	Keratitis	326	4%	Blepharitis	145	3%
9	Pain in eye	303	3%	No abnormality detected	123	3%
10	Foreign body on external eye	276	3%	Allergic conjunctivitis	118	3%
	Total attendances	8721		Total attendances	4433	

1027 attendances for the same week in April 2019. The month of April 2020 had a 68% decrease in mean attendances compared to April 2019 (Figure 1, Supplemental Figure 2). By September 2020 eye ED attendances had increased to 73% of the previous year's figures.

Comparing the most common diagnoses during the survey period in 2020 with that of 2019, absolute presenting numbers of posterior vitreous detachments and anterior uveitis cases saw less of a decrease than conditions such as conjunctivitis and corneal abrasions. (Table 1)

Comparing the May-June periods in 2020 and 2019, there was a statistically significant decrease ($p=0.01$) in the median distance travelled to the A& E from 8.9 to

8.6 km (Table 2). The mean distance travelled fell from 14.9 km to 12.3 km. When stratified into white and non-white patient groups, we found that white patients travelled significantly less ($p=0.02$) and contributed disproportionately to the changes in travel. The drop in mean travel distance appeared to be due to reduction in patients travelling in from very far distances during the pandemic (Supplemental Figure 3).

Patients under 18 did not show a statistically significant change in distances travelled to AnE, whilst all other age groups showed a reduction in distances travelled. There were no statistically significant differences observed in the median English Indices of Deprivation 2019 (IoD) rankings or deciles in the cohort, or when sub-divided into ethnic categories between the two years. Trend

Table 2. Patient demographics and attendance patterns.

	2019 May & June	2020 May & June	P-value
Total Number of attendees	8721	4433	
Average Length of Stay (Minutes) (Median, IQR)	126 (90)	72 (55)	+ <0.0001
Gender			
Male	4135 (47%)	2169 (49%)	
Age			
Mean (SD)	45.6 (20.4)	46.7 (20.1)	* 0.002
<18	725 (8%)	304 (7%)	
18-40	2838 (33%)	1417 (32%)	
40-60	2761 (32%)	1431 (32%)	
>60	2397 (27%)	1281 (29%)	
Ethnic demographics (n) (%)			
White	3746 (43%)	1853 (41%)	
Non-White	3256 (37%)	1762 (40%)	
Not-stated	1615 (20%)	798 (18%)	
Distances to AnE (km) (Median, IQR)			
All patients	8.9 (10.3)	8.6 (9.9)	+ 0.01
Distance Grouped by Ethnicity (Median, IQR)			
White	8.9 (10.3)	8.6 (9.8)	+ 0.02
Non-white	8.6 (10)	8.6 (9.6)	+ NS
Distance Grouped by Age Category (Median, IQR)			
0-18	8.6 (11.3)	8.6 (10.3)	+ NS
18-40	9.3 (9.5)	8.6 (9.2)	+ <0.001
40-60	8.9 (10.1)	8.9 (5.1)	+ 0.02
>60	8.6 (10.3)	8.6 (9.7)	+ NS
English Indices of Deprivation 2019 (IoD) (Median, IQR)			
Mean IoD Rank	14256 (12862)	14173 (12326)	+ NS
Mean IoD Decile	5 (4)	5 (4)	+ NS
Indices of Deprivation grouped by ethnicity			
White			
Rank	16868 (13249)	16425 (13568)	+ NS
Decile	6 (4)	6 (5)	+ NS
Non-white			
Rank	12090 (11230)	12105 (11112)	+ NS
Decile	4 (3)	4 (3)	+ NS

*independent 2-sided t-test, p-value = 0.05., + 2-sided Mann-Whitney Test, p-value = 0.05.

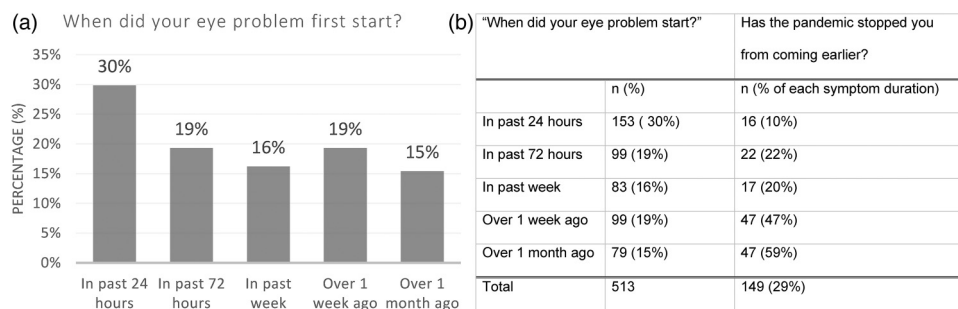


Figure 2. a) Patient reported symptom duration b) Duration of symptoms to presentation, and if the pandemic led to a delay in presentation.

changes in the distributions of the cohorts were observed when plotted according to their IoD rank, relatively fewer non-white patients attended from the most deprived

areas, whilst in all ethnic groups patients from the least deprived areas attended relatively less. (Supplemental figure 4).

Patient reported impact of COVID on seeking care

Clinical presentations. From our survey, 49.1% (252/513) of patients reported presenting within 3 days of symptom onset: 30% (153/513) within 24 h, and 19% (99/513) within 72 h of symptom onset. In addition, 16% (83/513) patients felt their symptoms to have begun in the week prior to ED attendance, 19% (99/513) waited more than 1 week and 15% (79/513) waited more than 1 month prior to attending the eye ED (Figure 2a).

Overall, 29% (149/513) patients responded that COVID-19 stopped them attending earlier and 59% (47/79) of patients with a one-month presentation delay indicated that the pandemic stopped them from coming in earlier (Figure 2b).

Clinician perspectives. 11% (50/456) of cases were delayed presentation from the Clinicians' perspective. 41% (188/456) of patients were documented to need urgent treatment and 19% (85/456) required urgent referral to specialist services (Figure 3).

Of the 50 patients deemed by the clinicians that should have attended earlier 25 patients also felt that their presentation was delayed (Figure 3). 80% (40/50) of this group presented after 72 h of symptom onset.

Clinicians indicated a video consultation would have been suitable for 40% (182/456) of attendees (Figure 4). However, only 13% (58/456) of patients indicated a preference for video compared to face-to-face consultation.

Discussion

We did not find significant alterations in the pattern of patient demographics apart from a decrease in the distance travelled by patients. This appeared to be from a group of patients who travelled in from long distances prior to the pandemic. Patients in the working age group of 18 to 60 travelled less. However, patients under 18 years of age seemed to present in similar proportions and travelled a similar distance, possibly reflecting that parental anxiety about their child's eye condition trumped lockdown when traveling to seek ophthalmic attention.^{17,18}

Historically, the hospital's proximity to large rail stations (Marylebone and Paddington stations) has meant that a portion of the eye ED attendances were working-aged adults who travelled into Central London for work. One hypothesis is that the differences in travel seen across the age and ethnic groups could be due to the shift towards working from home, with fewer commuters for this patient group.¹⁹ Reassuringly, our data did not show a statistically significant change in the mean IoD ranking or decile between 2019 and 2020.

The reluctance of patients to attend hospital is not isolated to ophthalmology departments during the pandemic.¹⁴ A review of activity trends of key NHS services by The

Health Foundation identified that general A&E attendances fell by 52% in March 2020 compared to March 2019, with only a partial recovery to 36% below normal by mid-May 2020.²⁰ A&E attendance numbers also mirrored changes in national lockdown guidelines. NHS England noted that these changes were at least partly 'likely' due to changes in patient behaviour. A study of the impact on another major eye unit in London also demonstrated that weekly attendance to the emergency department dropped by >50% at the beginning of April 2020.⁵

This drop in numbers could be related to the anxiety surrounding catching COVID-19. A systematic meta-analysis looking at the psychological and mental impact of COVID-19 on both health workers and the general population found that the pooled prevalence of anxiety and depression was 33% and 28%, respectively.²¹ This was highest amongst those with pre-existing conditions. Common risk factors included social isolation, female gender, nurse occupation and having a lower socioeconomic status. Focussing on an ophthalmic setting, fear of contracting COVID-19 by patients has been previously demonstrated, with one web-based survey of the British public finding that participants appeared to have reduce urgency for review of ocular symptoms when factoring in COVID.¹⁴ Many ophthalmic conditions are associated with ageing, and the aged population are at higher risk.²² In addition, patient to ophthalmologist separation during clinical examination at the slit lamp is far less than the 1-2 metres recommended for social distancing. COVID-19 can also manifest as ocular pathology, such as conjunctivitis.²³

One of the main limitations of this study is the low rate (10%) of survey ascertainment in the casualty attendees, resulting in a large proportion of our patient population not being represented in the results. We did not perform a non-response analysis; hence the study is susceptible to selection bias.

However, our study is unique among recent publications on COVID-19 impact on eye ED services because it explores relationships between patient and clinician perspectives of Ophthalmic eye ED presentations during the COVID-19 pandemic. The results suggest that the COVID-19 pandemic may have contributed to patients delaying their presentation to the eye ED. Clinicians felt that a total of 50 (11%) patients presented late with an adverse effect on the patient's condition, and concordance between both parties for these 50 patients was 50%. Of the presentations in the survey, 24% was for sight threatening disease with 41% needing urgent treatment.

The other aspect of our study was to compare patient and clinician opinions on the suitability of video/remote consultations as an alternative to face-to-face consultations. We found that patients and clinicians were not equally enthusiastic about video consultations, with only 22 (12%) patients agreeing out of the 182 patients that clinicians had thought were suitable. An alternative consultation strategy has

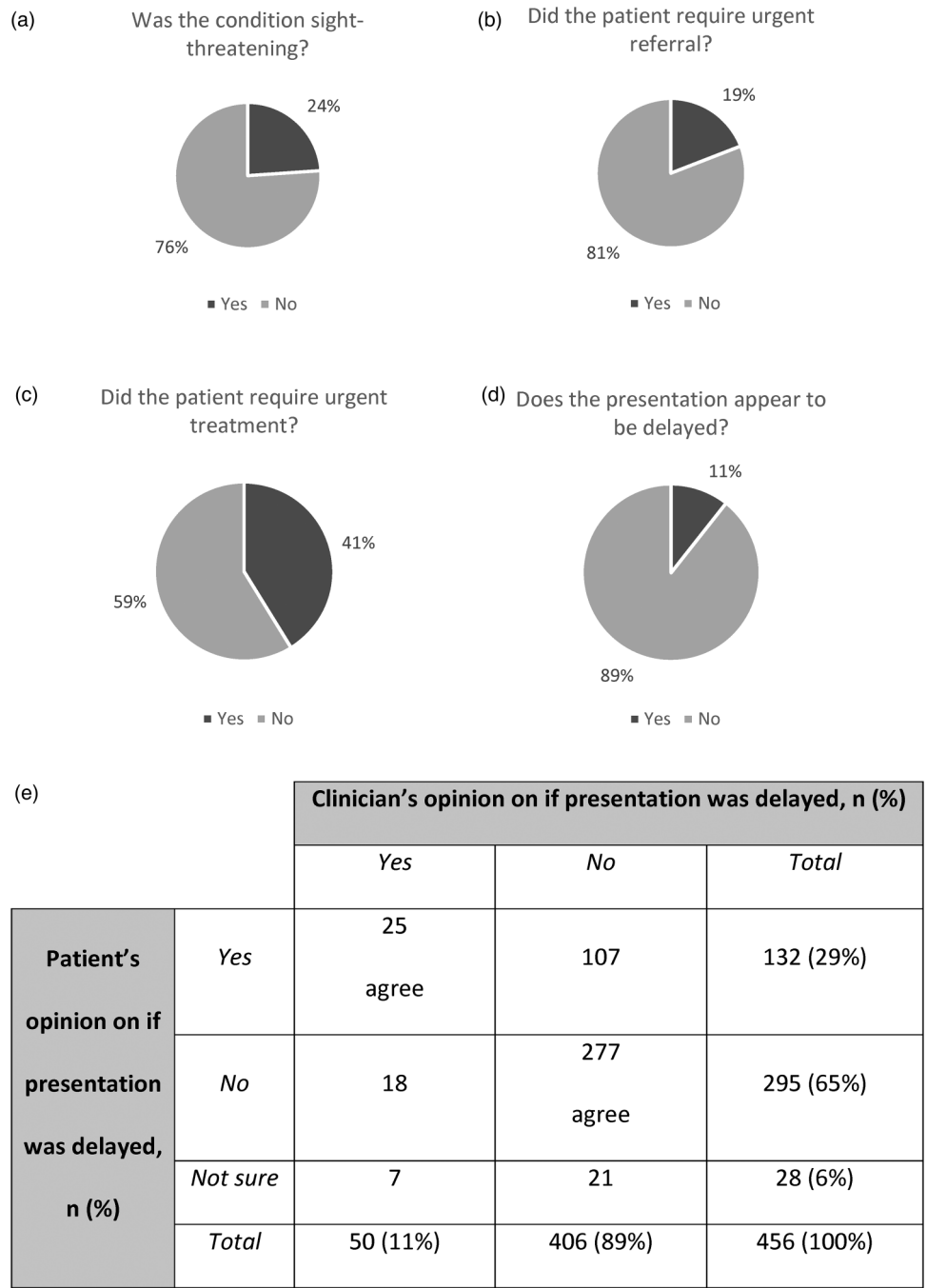


Figure 3. Clinician impressions of if condition was (a) sight threatening, (b) required urgent referral, (c) required urgent treatment, (d) with a delayed presentation. (e) Clinician and patient opinions on if presentation was delayed.

proved important to improve access to timely healthcare, reduce the real and perceived risk of COVID-19 transmission for vulnerable patients, and circumvent the problem of staff shortages due to self-isolation by allowing them to work from home.⁷ Much of ophthalmology diagnosis is based on clinical examination and visualisation. Therefore, video consultation may allow better examination and diagnosis than telephone consultation. Prior to

COVID-19 video consultations have not been part of normal ophthalmology practice, but centres have been forced to adapt. For example, another major London ophthalmology unit implemented a video consultation triage service in its accident and emergency (A&E) during COVID-19, which was used for up to 57% of the patients.⁵ Of these, only 21.1% needed further A&E management, with the rest being managed by general practitioners,

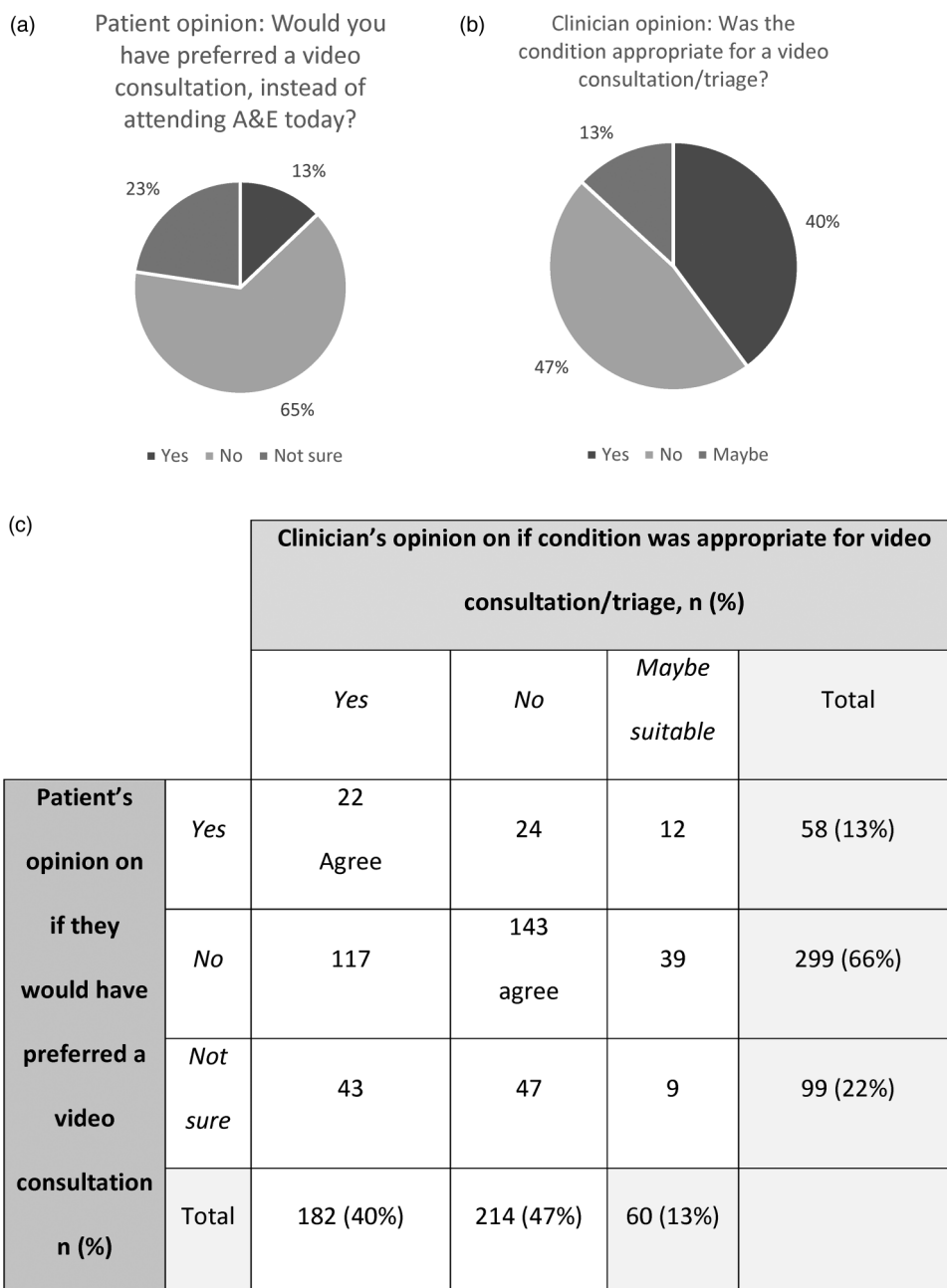


Figure 4. Attitudes to video consultation (a) patient preferences for video consultation (b) clinician opinions on video consultation appropriateness. (c) Comparison of patient and clinician opinions.

advice, remote prescription, referral to hospital subspecialty services, or diversion to a local eye unit. Considering that prior to COVID-19, 40% of patients attending the department were not considered to be emergency or life-threatening, this system is likely to reduce hospital burden significantly. Mean patient satisfaction was also found to be 4.9/5.²⁴

A non-randomised trial comparing video with both face-to-face and telephone consultations in UK general practices reported no difference in terms of consultation length,

content, and quality compared with telephone consultations.²⁵ However, both forms of remote consultations were regarded as less information-rich than face-to-face consultations with technical problems being common. Doctors' attitudes towards video consultations were mixed, some recognising the possible benefits of video versus telephone consultations through visual cues and better rapport building, but also highlighting concerns around privacy and increasing workload. In contrast to our patients' reluctance to video consultations, other studies where tele-ophthalmology has been

implemented have shown promising results. For example, An Australian study found that patient satisfaction with real-time video consultation for various ocular conditions was high with patients reporting that it enabled them to save money and time.²⁶

The subsequent waves have been tempered by the successful rollout of the vaccination program, and various other factors may also have had different impact on patients' perspectives.²⁷ For example, when A&E attendances were low after the first lockdown, multiple information campaigns were launched by NHS England to encourage patients to use the NHS for urgent conditions, such as strokes. As a result, attendance numbers rose over the summer of 2020 and continues to rise. A similar information campaign might be helpful in educating patients about telemedicine and encouraging them to seek help for ophthalmic conditions.

In conclusion, our survey results found that COVID-19 may have caused a delay in presentation for emergency eye care. Demographic changes and attitudes towards video consultations have implications for patient education and service planning. Future work may involve repeating the same survey in representative months.

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Author contributions

VL conceived of the presented idea. EL MK RH ZR performed the data collection. ZR supervised the project. EL & MK took the lead in writing the manuscript. VL provided critical feedback and helped shape the research, analysis and results and to the writing of the manuscript. All authors discussed the results and contributed to the final manuscript.


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Supplemental material

Supplemental material for this article is available online.

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