Reducing omission of eye drops during hospital admission

Abstract

Background/Aims Chronic ophthalmic conditions, such as glaucoma and dry eye disease, are frequently encountered debilitating eye conditions that can lead to substantial reduction in vision and quality of life. However, there is ongoing evidence to suggest that topical ophthalmic therapy is inappropriately omitted on admission to hospital. The primary aim of this audit was to investigate the trust adherence to the National Institute for Health and Care Excellence guideline on the prescribing standard of eye drops during hospital admission. The secondary aim was to raise awareness and ensure successful compliance with national standards to reduce unintentional omission of eye drops on admission and subsequent complications.

Method Electronic medical records of all medical and surgical adult inpatients were studied prospectively on two different occasions. The quality of documentation of eye drops in clerking notes, the length of time taken between the admission and prescription of eye drops, and the accuracy of the prescription were examined. Following the initial audit, interventions focusing on clinician education were implemented. This includes highlighting the importance of eye drops in all departmental mandatory introductory sessions and putting up posters on all the wards as prompts. The same data collection method was used in the reaudit.

Results In the initial audit, 64 (mean age 81.8±8.9 years) patients with regular prescriptions for eye drops were identified; 38 (59.4%) patients had eye drops for dry eye disease only, 20 (31.3%) patients had eye drops for glaucoma only, and six (9.4%) patients had eye drops for both. In the reaudit, 57 (mean age 76.7±15.3 years) patients were identified; 42 (73.7%) patients had eye drops for dry eye disease only, 10 (17.5%) patients had eye drops for glaucoma only, and five (8.8%) patients had eye drops for both. Following the intervention, there was a significant improvement in documentation of ocular diagnosis and eye drops on clerking notes from 41% to 65% (P=0.008), and eye drop reconciliation within 24 hours of admission improved from 45% to 75% (P=0.0008). All patients (100%) received the correct eye drop prescription before and after the intervention.

Conclusions Education is effective in promoting adherence to national guidelines and reducing the incidence of inappropriate omission of eye drops on admission to hospital.

Key words: Dry eye; Eye drops; Glaucoma; Medication reconciliation; Patient safety

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Charlotte S Ho[1]

Darren SJ Ting[2,3]

Devina Gogi[1]

Author details can be found at the end of this article

Correspondence to:
Charlotte S Ho; charlotte.shan.ho@doctors.org.uk

Introduction

Chronic ophthalmic conditions, such as glaucoma and dry eye disease, are frequently encountered debilitating eye conditions that can lead to a substantial reduction in vision and quality of life. Glaucoma is one of the leading causes of vision impairment and blindness globally, with a prevalence of 6.9 billion (World Health Organization, 2020). Dry eye disease is a common chronic multifactorial condition attributed to corneal epithelial dysfunction, with a global prevalence varying from 5% to 50% (Stapleton et al, 2017). Dry eye disease gives rise to a persistent burning or gritty sensation in the eyes and visual disturbances, which often interfere with activities of daily living, such as reading or driving. Untreated or inadequately treated dry eye disease can increase the risk of corneal infection, melt, perforation or even blindness (Stapleton et al, 2017; Ting and Ghosh, 2019).

Eye drops are the most common treatment for chronic ophthalmic conditions, including glaucoma and dry eye disease. The National Institute for Health and Care Excellence

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(2015b) guideline on medicines optimisation recommends that patients receive medication reconciliation within 24 hours of admission. Despite this, there is ongoing evidence that topical ophthalmic therapy is inappropriately omitted when patients with long-term eye conditions are admitted to non-ophthalmic wards (Masri and Robinson, 2010; Longmore et al, 2017).

The primary aim of this audit was to investigate the trust adherence to the National Institute for Health and Care Excellence (2015b) guideline on the prescribing standard of eye drops during hospital admission. The secondary aim was to raise awareness and ensure successful compliance to the national standards to reduce unintentional eye drop omission on admission and subsequent complications.

The audit

Method

The electronic medical records of all medical and surgical adult (above 16 years old) inpatients were studied on two different occasions, providing data from a total of 467 patients. Intensive care unit, accident and emergency, ophthalmology and paediatric patients were excluded in this study. Data were collected prospectively on two consecutive days in December 2020. Patients' drug charts and documentations on all surgical wards were examined on the first day, and the same procedure was repeated on all medical wards on the following day.

Electronic drug charts were studied alongside electronic community prescriptions, admission clerking notes, pharmacy notes and recent hospital discharge letters to improve data accuracy. Relevant information, including the patient's demographics, date of admission, admission diagnosis, medication documentation, name and type of eye drops prescribed, and time taken to prescribe eye drops following admission, were documented on Microsoft Excel for analysis.

One week after the day of data collection, the drug charts of patients with eye drops omitted inappropriately on the day of data collection were revisited to note whether the error had been rectified. The number of patients with ocular diagnosis and medications documented on clerking notes, eye drops reconciled within 24 hours of admission, and correct eye drops prescribed were measured.

Results

A total of 64 patients with repeat eye drop prescriptions were identified among 467 inpatients. The mean age was 81.8±8.9 years with 26 (40.6%) male and 38 (59.4%) female patients. The type of eye drops identified is summarised in Table 1.

Documentation of ocular diagnosis and eye drops was found in 26 (40.6%) patients' clerking notes. Of the 64 patients, 29 (45%) were prescribed the eye drops they were using within 24 hours of admission. Out of the 29 patients who received medication reconciliation within 24 hours of admission, five did not have appropriate clerking documentation. All patients ultimately received the correct eye drops, which were prescribed at different times during their stay in hospital, ranging from less than 24 hours to 9 days.

Table 1. Summary of the audit findings

		Dry eyes eye drops	Glaucoma eye drops	Both dry eyes and glaucoma eye drops	Total
Number of patients		38	20	6	64
Ocular diagnosis and medication documented on clerking notes		50.0% (19/38)	30.0% (6/20)	16.7% (1/6)	40.6% (26/64)
Eye drops reconciled within 24 hours of admission		44.7% (17/38)	55.0% (11/20)	16.7% (1/6)	45.3% (29/64)
Eye drops reconciled beyond 24 hours of admission	24–48 hours	26.3% (10/38)	30.0% (6/20)	33.3% (2/6)	28.1% (18/64)
	48–72 hours	5.2% (2/38)	5.0% (1/20)	33.3% (2/6)	7.8% (5/64)
	>72 hours	23.7% (9/38)	10.0% (2/20)	16.7% (1/6)	18.8% (12/64)
Correct prescriptions of eye drops		100.0% (38/38)	100.0% (20/20)	100.0% (6/6)	100.0% (64/64)

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The intervention

Based on the results of the audit, the following interventions were carried out to raise awareness among non-ophthalmology clinicians of the importance of eye drops.

The findings from this audit were discussed with the ophthalmologists, including glaucoma and corneal disease specialists, in a monthly departmental meeting. Potential factors contributing to clinicians' poor awareness of a patient's ocular diagnosis and medications include the patient's reluctance to disclose their ocular past medical history. This could be a result of perceived stigma of vision loss (especially in patients with glaucoma), perception of disease and fear. To encourage patient disclosure on clerking, ophthalmologists advised clerking techniques, such as rephrasing the question from 'Do you use any glaucoma eye drops?' to 'Do you use any pressure lowering eye drops?'.

Presentations were given to doctors working on medical and surgical wards in multiple meetings. The local pharmacy department has also included this topic in all departmental mandatory introductory sessions. The findings of this audit were highlighted, as well as reiterating the importance of reconciling eye drops and checking drug interactions within 24 hours of admission. Advice from the ophthalmologists, as mentioned above, was also relayed. Moreover, posters with simple steps illustrating how to minimise omission of eye drops were placed on wards as prompts (Appendix 1). Reminder emails were sent to ensure this information reached all doctors.

The reaudit

Methods

The same method as the audit was used in the reaudit. A total of 534 patients' electronic medical records on the electronic patient record system were studied on two different occasions. The same inclusion and exclusion criteria as the initial audit applied. Data were collected prospectively on two consecutive days in October 2021. As previously, the following information were collected from electronic community prescriptions, admission clerking notes, pharmacy notes and recent hospital discharge letters: the patient's demographics, date of admission, admission diagnosis, medication documentation, name of eye drops prescribed and the time taken to prescribe eye drops following admission. Data collected were documented and analysed using Microsoft Excel. Data before and after the implementation of the intervention were compared using the chi-squared test; statistical significance was defined as $P<0.05$.

Results

A total of 57 patients with repeat eye drop prescriptions were identified. The mean age was 76.7±15.3 years with 23 (40.4%) male and 34 (59.6%) female patients. The type of eye drops identified is summarised in Table 2.

Table 2. Summary of the reaudit findings

		Dry eyes eye drop	Glaucoma eye drops	Both dry eyes and glaucoma eye drops	Total
Number of patients		42	10	5	57
Ocular diagnosis and medication documented on clerking notes		54.8% (23/42)	90% (9/10)	100% (5/5)	64.9% (37/57)
Eye drops reconciled within 24 hours of admission		66.7% (28/42)	100% (10/10)	100% (5/5)	75.4% (43/57)
Eye drops reconciled beyond 24 hours of admission	24–48 hours	9.5% (4/42)	0% (0/10)	0% (0/5)	7.0% (4/57)
	48–72 hours	11.9% (5/42)	0% (0/10)	0% (0/5)	8.8% (5/57)
	>72 hours	11.9% (5/42)	0% (0/10)	0% (0/5)	8.8% (5/57)
Correct prescriptions of eye drops		100.0% (42/42)	100.0% (10/10)	100.0% (5/5)	100.0% (57/57)

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Table 3. Comparison of the documentation and prescribing standards for eye disease or treatment on clerking notes before and after the intervention

Outcome	Before intervention Total *n*=64	After intervention Total *n*=57	*P* value
Ocular diagnosis and medication documented on clerking notes	40.6% (26/64)	64.9% (37/57)	0.008
Ocular diagnosis and medication not documented on clerking notes	59.4% (38/64)	35.1% (20/57)	
Eye drops reconciled within 24 hours of admission	45.3% (29/64)	75.4% (43/57)	0.0008
Eye drops not reconciled within 24 hours of admission	54.7% (35/64)	24.6% (14/57)	

Following the introduction of the intervention, documentation of ocular diagnosis and eye drops on clerking notes improved from 40.6% (26/64) to 64.9% (37/57), and eye drop reconciliation within 24 hours of admission improved from 45.3% (29/64) to 75.4% (43/57).

Statistical analysis

The chi-squared test was performed to compare the significance of improvement on documentation and eye drop reconciliation before and after the implementation of the intervention. The results are summarised in Table 3.

There was a significant improvement in the documentation of eye conditions (including glaucoma and dry eye disease; P=0.008) and prescribing of the eye drops (P=0.0008) after the implementation of the new interventions.

Discussion

The initial audit showed that 54.7% (35/64) patients did not receive eye drops within 24 hours of admission, as recommended by National Institute for Health and Care Excellence (2015b). With the importance of eye drops emphasised to both patients and clinicians through education, there was a statistically significant improvement in clerking documentation of ocular diagnosis and timely prescribing of eye drops during admission. The authors believe that the potential factors contributing to the poor rates of reconciliation of eye drops on admission were:

1. Poor awareness by clinicians of the importance of eye drops
2. Clinicians were not aware of patients' eye conditions and medications, so patients' regular eye drop prescriptions were missed
3. Oral is the most commonly used route of drug administration for regular home medications; other less frequently used routes of medication administration, such as eye drops, can be overlooked.

As defined by the National Prescribing Centre, medication reconciliation should be a two-stage process, with clinicians performing the basic level 1 reconciliation within 24 hours of admission and pharmacists performing a full level 2 reconciliation after (National Institute for Health and Care Excellence, 2015a). Although ocular diagnosis and eye drops were not documented on clerking notes, 17.2% (5/29) of patients in the initial audit and 16.3% (7/43) of patients in the reaudit received their regular eye drops within 24 hours of admission. This could be attributed to pharmacists performing level 2 medication reconciliation within 24 hours of admission. This highlights the significance of communication between different departments, involving medical staff and pharmacists, as well as national adherence to National Institute for Health and Care Excellence and National Prescribing Centre guidelines, during medication reconciliation to prevent unintentional omission of eye drops.

In this study, it was noted that an elderly patient who took beta-blocker eye drops (timolol) for glaucoma developed heart block and bradycardia during admission. The eye drops were discontinued immediately by the reviewing clinician. Beta-adrenoceptor blocker eye drops – a common topical medication for glaucoma – should be reviewed and suspension of the

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Key points

- In order to reduce unintentional omission of eye drops on admission and subsequent complications, national adherence to the National Institute for Health and Care Excellence guideline on the prescribing standard of eye drops during hospital admission is important.
- Ocular diagnosis and medications should be clearly documented on the clerking note on every admission.
- Medication reconciliation should be performed within 24 hours of admission.
- Education is an effective way of raising awareness and promoting better eye care for patients.

eye drops considered in patients who present with clinical features of asthma, hypotension and marked bradycardia (British National Formulary, 2020). Although uncommon, topical medications may induce systemic side effects via undesired systemic absorption via the ocular surface and the nasal mucosa, bypassing the first-pass metabolism in the liver (Farkouh et al, 2016). Once glaucoma treatment has been suspended, an alternative therapy should be discussed with an ophthalmologist. If this is not done, the subsequent increase in intraocular pressure could potentially threaten a patient's vision, which includes visual field loss (Gazzard et al, 2003) and retinal vein occlusion (Hayreh et al, 2004).

Ocular surface disease occurs in up to 60% of critically ill patients, as many of the mechanisms that protect the eye against infection and injury are disrupted (Saritas et al, 2013). In this study, two patients with dry eye disease were transferred to the intensive care unit soon after admission for organ support. As ocular diagnosis and topical therapy were not documented on the clerking notes, both patients experienced a delay in receiving their eye drops in the intensive care unit, an environment with the presence of risk factors – including sedation, lagophthalmia, low humidity and low temperature – that favour the development of dry eye disease (Fernandes et al, 2018; Ting et al, 2020). Lubricating eye drops, artificial tears and ointments are therefore essential in restoring tear film, and reducing the susceptibility of intensive care unit patients to develop worsening dry eye disease, or complications such as corneal epithelial defect (Hearne et al, 2018).

Ophthalmic prescription errors as a result of illegible handwriting and lack of information (for example wrong or no side indicated, missing eye drop strength, and wrong or no frequency of use) is more common in written prescriptions (Utman et al, 2013). Using a computer-based prescribing system minimises these errors and their harmful consequences, as demonstrated by the 100% accuracy of eye drop prescriptions in this study.

Conclusions

This study has highlighted the importance of national adherence to the National Institute for Health and Care Excellence guideline in reconciling eye drops on admission, and the effectiveness of education in promoting better eye care for patients. By incorporating topics related to eye drops in departmental introductory talks and mandatory teaching sessions, it is hoped that the incidence of inappropriate omission of eye drops can continue to decrease nationally.

Author details

[1]Department of Ophthalmology, Calderdale Royal Hospital, Halifax, UK

[2]Academic Ophthalmology, Division of Clinical Neuroscience, School of Medicine, University of Nottingham, Nottingham, UK

[3]Department of Ophthalmology, Queen's Medical Centre, Nottingham, UK

Conflicts of interest

The authors declare that they have no conflicts of interest.

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References

British National Formulary. Timolol maleate. 2020. https://bnf.nice.org.uk/drug/timolol-maleate.html#indicationsAndDoses (accessed 24 November 2021)

Farkouh A, Frigo P, Czejka M. Systemic side effects of eye drops: a pharmacokinetic perspective. Clin Ophthalmol. 2016; 10:2433–2441. https://doi.org/10.2147/OPTH.S118409

Fernandes APNL, Araújo JNM, Botarelli FR et al. Dry eye syndrome in intensive care units: a concept analysis. Rev Bras Enferm. 2018;71(3):1162–1169. https://doi.org/10.1590/0034-7167-2016-0582

Gazzard G, Foster PJ, Devereux JG et al. Intraocular pressure and visual field loss in primary angle closure and primary open angle glaucomas. Br J Ophthalmol. 2003;87(6):720–725. https://doi.org/10.1136/bjo.87.6.720

Hayreh SS, Zimmerman MB, Beri M, Podhajsky P. Intraocular pressure abnormalities associated with central and hemicentral retinal vein occlusion. Ophthalmology. 2004;111(1):133–141. https://doi.org/10.1016/j.ophtha.2003.03.002

Hearne BJ, Hearne EG, Montgomery H, Lightman SL. Eye care in the intensive care unit. J Intensive Care Soc. 2018;19(4):345–350. https://doi.org/10.1177/1751143718764529

Longmore M, Jethwa N, Shah R, Kroker P. Eye drop medications ignored in geriatric inpatients on general medical wards. Age Ageing. 2017;46(suppl_1):i1–22. https://doi.org/10.1093/ageing/afx055.38

Masri I, Robinson R. Glaucoma medication ignored in general medical and surgical patients. JRSM Short Rep. 2010;1(1):1–3. https://doi.org/10.1258/shorts.2009.090173

National Institute for Health and Care Excellence. Improving and maintaining medicines reconciliation on admission at North Bristol NHS Trust (NBT). 2015a. https://www.nice.org.uk/sharedlearning/improving-and-maintaining-medicines-reconciliation-on-admission-at-north-bristol-nhs-trust-nbt (accessed 24 November 2021)

National Institute for Health and Care Excellence. Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes. 2015b. https://www.nice.org.uk/guidance/ng5/chapter/1-Recommendations#medicines-reconciliation (accessed 24 November 2021)

Saritas TB, Bozkurt B, Simsek B et al. Ocular surface disorders in intensive care unit patients. Sci World J. 2013;2013(182038):1–5. https://doi.org/10.1155/2013/182038

Stapleton F, Alves M, Bunya VY et al. TFOS DEWS II Epidemiology Report. Ocul Surf. 2017;15(3):334–365. https://doi.org/10.1016/j.jtos.2017.05.003

Ting DSJ, Ghosh S. Acute corneal perforation 1 week following uncomplicated cataract surgery: the implication of undiagnosed dry eye disease and topical NSAIDs. Ther Adv Ophthalmol. 2019;11:2515841419869508. https://doi.org/10.1177/2515841419869508

Ting DSJ, Deshmukh R, Said DG, Dua HS. Care for critically ill patients with COVID-19: don't forget the eyes. Eye (Lond). 2020;34(7):1253–1254. https://doi.org/10.1038/s41433-020-0959-0

Utman SA, Atkinson PL, Baig HM. Methods to reduce prescription errors in ophthalmic medication. Saudi J Ophthalmol. 2013;27(4):267–269. https://doi.org/10.1016/j.sjopt.2013.09.003

World Health Organization. Blindness and vision impairment. 2020. https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment (accessed 24 November 2021)

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Appendix 1. Poster illustrating how to minimise eye drop omissions

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