Reprint from The Review of DIABETIC STUDIES

The Review Of
DIABETIC
STUDIES OPEN ACCESS

An Integrated Approach to Visual Health and Medication Safety: Combining Optometric Assessment, Ocular Disease Screening, Pharmacological Management, and the Prevention of Drug-Related Visual Complications.

Ahmed Attiyah Alharbi[1], Shari Thawab Alqahtani[2], Heba Mohammad Qunq[3], Abdulsalam Hassan H Abu Sulayman[4], Ibrahim Dawy Alotiaibi[5], Amin Amir Turkestani[6], Abedullah Mohammed Alkhateeb[7], Hasan Abdulaziz Ghurab[8], Abdulaziz Mousa Alzahrani[9], Abdulkareem Yahya Abdulfattah Alqbli[10]

[1] *Optical Technician, King Abdullah Medical Complex, Saudi Arabia*
[2] *Department of Pharmacy, King Abdulaziz Hospital, Makkah, Saudi Arabia*
[3] *PharmD, Associate Executive, Supply Chain, King Abdullah Medical City, Makkah, Saudi Arabia*
[4] *Department of Pharmacy, King Abdulaziz Hospital, Makkah, Saudi Arabia*
[5] *Pharmacy Technician, King Abdullah Medical City, Makkah, Saudi Arabia*
[6] *Pharmacy Technician, King Abdullah Medical City, Makkah, Saudi Arabia*
[7] *Pharmacist, King Abdullah Medical City, Makkah, Saudi Arabia*
[8] *Pharmacy Technician, King Abdullah Medical City, Makkah, Saudi Arabia*
[9] *Pharmacy Technician, Althager General Hospital, Jeddah, Saudi Arabia*
[10] *Pharmacy Technician, Madinah Health Cluster, Madinah, Saudi Arabia*

Abstract

Background: Reduced vision may reflect refractive error, ocular disease, or a medication effect. Screening and prescribing often take place in different services, creating opportunities for missed referrals or overdue monitoring. Objective: To synthesize evidence on how eye care and pharmacy teams can integrate ocular disease screening, pharmacological management, and prevention of medication-related visual complications in adult care. Methods: Targeted literature searches identified guidelines, systematic reviews, trials, and observational studies published through December 2024. Selected drug safety warnings were checked against dated regulatory documents. Results: Diabetes warrants scheduled retinal assessment even when vision is normal. Glaucoma evaluation requires interpretation of pressure, optic nerve findings, and visual fields in context. Safe ophthalmic prescribing depends on the indication, systemic contraindications, and the patient's ability to use drops. Hydroxychloroquine, ethambutol, topiramate, corticosteroids, and pentosan polysulfate illustrate distinct patterns of harm that require different surveillance and responses. Conclusion: Integration is most useful when teams share a medication history, specify which test is needed and when, and verify that referrals and abnormal results lead to action. Acute symptoms require timely assessment, while equivocal surveillance findings should be confirmed before altering otherwise beneficial treatment.

Keywords: optometry; vision screening; ocular toxicity; medication safety; drug monitoring; interprofessional care

1. Introduction

Refractive correction, detection of ocular disease, and prevention of medication toxicity are different tasks that may begin at the same visit. Global burden estimates identify uncorrected refractive error and cataract among major causes of vision impairment. Yet a satisfactory refraction or preserved central acuity cannot exclude early glaucoma, retinal disease, or an adverse drug effect. An eye care history that includes both systemic medicines and eye drops can help determine whether a patient needs new lenses, diagnostic evaluation, or a medication review. [1, 2]

A clinically useful pathway connects findings to the person who can act on them. Eye care teams can document visual function and localize a suspected problem. Pharmacy teams can verify what was dispensed and used, identify dose or formulation changes, and support safe administration. Prescribers and ophthalmology teams can then weigh treatment benefits against a confirmed or suspected ocular complication. This review focuses on adult ambulatory care, with selected examples from retinal screening, glaucoma management, and drug toxicity.

2. Methods

This review used targeted searches of PubMed-indexed literature and dated professional and regulatory documents published through December 31, 2024. Search concepts included adult eye assessment, diabetic retinopathy screening, glaucoma detection and treatment, ophthalmic drop use, and ocular complications of hydroxychloroquine, ethambutol, topiramate, corticosteroids, and pentosan polysulfate. A separate search addressed Saudi screening context and adverse event reporting.

Guidelines informed screening and monitoring recommendations. Randomized trials and systematic reviews informed comparisons of screening or treatment approaches. Cohorts and case series were retained when they characterized exposure-related risk or uncommon toxicities. Results were interpreted according to study design and population. No pooled estimate or formal certainty rating was undertaken.

3. Results

3.1 Optometric Assessment and Ocular Disease Screening

Record symptoms and their onset, laterality, and progression before taking measurements. Document monocular visual acuity with the patient's current correction and use refraction or pinhole testing when appropriate. Improvement with a pinhole suggests a refractive contribution. Persistently reduced acuity, new asymmetry, visual field symptoms, or concerning ocular findings warrant further assessment even if some acuity improves with refraction. Examination and testing should be performed within the professional's scope, with referral when the required assessment is unavailable. [2, 3]

Urgency should be determined before a routine screening visit continues. Sudden, painless monocular loss can indicate retinal arterial occlusion and requires emergency evaluation through a stroke-capable pathway when suspected. A new field shadow with flashes or floaters warrants urgent assessment for a retinal tear or detachment. New central distortion or a central scotoma in an older adult should prompt macular assessment for causes such as neovascular age-related macular degeneration (AMD). A plausible medication exposure does not remove the need to investigate these presentations. [4-6]

Diabetic retinopathy may be present without symptoms. The 2024 American Diabetes Association standards recommend an initial dilated, comprehensive eye examination at diagnosis for type 2 diabetes and within five years of onset for adults with type 1 diabetes. When one or more annual examinations show no retinopathy and glycemic indicators are at goal, a one- to two-year interval may be considered. Any retinopathy generally requires at least annual review, with closer follow-up for progressing or sight-threatening disease. [7]

Retinal photography with remote grading can improve access. In a randomized trial, offering telemedicine increased the proportion of patients screened in the first six months from 43.9% with traditional surveillance to 94.6%. This finding concerns screening completion, not visual outcomes. Programs need a route for timely assessment when images are abnormal or ungradable and a process to confirm the referral was completed. A study from the Saudi National Diabetes Registry documented retinopathy and associated risk factors in registry participants; a facility should measure its own screening coverage rather than use registry findings as a local estimate. [7-9]

Glaucoma case finding differs from population screening. The US Preventive Services Task Force found insufficient evidence to determine the benefits and harms of screening asymptomatic adults aged 40 years or older for primary open-angle glaucoma. That conclusion does not address diagnosis or follow-up after suspicious findings. Intraocular pressure (IOP), optic nerve appearance, and repeatable visual field

findings should be interpreted together; angle assessment distinguishes open-angle disease from angle closure when clinically indicated. Neither a single pressure reading nor optical coherence tomography (OCT) alone establishes glaucoma. [10, 11]

Table 1 summarizes the assessment and referral decisions for these presentations.

Table 1. Adult eye assessment and referral by presentation

Clinical situation	Initial assessment or screen	Next decision
Gradual blur without alarm symptoms	Record monocular acuity with current correction; assess refractive contribution. [2, 3]	Refer for comprehensive assessment if acuity remains unexplained or other findings are abnormal.
Diabetes without visual symptoms	Arrange the initial dilated examination at the interval appropriate to diabetes type; use validated imaging in screening programs. [7, 8]	Set recall by retinal status. Arrange examination for positive or ungradable images.
Possible glaucoma	Confirm pressure and assess disc, visual fields, and anterior chamber angle as indicated. [11]	Refer for diagnostic evaluation when findings are suspicious or tests are unavailable.
New central distortion	Check acuity and arrange macular evaluation, including OCT where available. [6]	Expedite referral if neovascular AMD is suspected.
Sudden vision loss or new field shadow	Establish onset and laterality without delaying referral. [4, 5]	Use an emergency stroke pathway for suspected retinal arterial occlusion; seek urgent retinal assessment for suspected detachment.

AMD, age-related macular degeneration; OCT, optical coherence tomography.

3.2 Pharmacological Management and Safe Drop Use

Treatment should follow diagnosis and risk assessment. In the Ocular Hypertension Treatment Study, topical pressure lowering reduced the five-year probability of developing primary open-angle glaucoma from 9.5% with observation to 4.4% in the treated group. This was a selected ocular hypertension population, not a treatment threshold for everyone with an elevated pressure. For suitable patients with newly diagnosed ocular hypertension or open-angle glaucoma, the LiGHT trial found that 74.2% assigned to initial selective laser trabeculoplasty maintained their target pressure without drops at three years. When medication is chosen, a prostaglandin analogue is a common first option. Choice and follow-up should account for disease stage, target pressure, contraindications, and the ability to use the prescribed treatment. [11-13]

Pharmacological treatment of retinal disease requires a different pathway. After a specialist confirms neovascular AMD, intravitreal vascular endothelial growth factor inhibitors can preserve or improve vision. They are also first-line treatment for most eyes with center-involving diabetic macular edema and impaired visual acuity. Completion of screening is therefore only an intermediate step. The clinical benefit depends on reaching the treating service and being able to continue the indicated follow-up. [6, 7]

Topical administration does not prevent systemic exposure. Before dispensing a topical beta blocker such as timolol, check for asthma, clinically relevant bradycardia or conduction disease, and concurrent rate-lowering medicines. In asthma, a population-based study and meta-analysis found that acute exposure to nonselective beta blocker eye drops worsened lung function and was associated with exacerbations. This risk calls for prescriber review of the drug choice; instillation technique cannot overcome a contraindication. [11, 14]

Ask patients to show how they use the bottle. Direct observation has found that patients who report little

difficulty may miss the eye or touch it with the tip, and adherence and persistence with glaucoma drops vary. Demonstrate delivery of one drop into the prescribed eye, keeping the tip clear of the ocular surface. Where appropriate, eyelid closure or nasolacrimal occlusion after instillation can reduce systemic absorption. If burning or ocular surface symptoms interfere with use, review drop burden, preservatives, and the ocular surface with the treating clinician. Discuss alternatives before the patient abandons treatment. [15-18]

3.3 Preventing and Recognizing Drug-Related Visual Complications

The medication history should establish the indication, start date, actual daily dose, dose or formulation changes, and relevant coexposures. Interpret symptoms by their timing and location. A slowly evolving paracentral defect on hydroxychloroquine has different implications from acute bilateral blur and pain after starting topiramate. Conversely, coincidental retinal disease can account for symptoms in someone taking a potentially toxic medicine. A useful record pairs the exposure history with visual findings and the action taken.

Hydroxychloroquine. The American Academy of Ophthalmology (AAO) and a multisociety statement support a daily dose at or below 5 mg/kg of actual body weight to limit retinopathy risk. At a given dose, risk still rises with duration. In a surveillance cohort, 15-year cumulative incidence was 2.7% at 5 mg/kg/day or less and 21.6% above 6 mg/kg/day. These estimates include mild disease identified by screening and come from an observational cohort. Kidney disease and concomitant tamoxifen are additional risk factors. Weight or renal function changes should prompt reassessment of dosing and the monitoring plan with the prescriber. [19-22]

The AAO approach in use by 2024 advised a baseline assessment and annual testing by five years for patients on appropriate doses without major risk factors, with earlier surveillance when risk is greater. Spectral-domain OCT and automated visual fields are complementary. Testing should cover pericentral as well as parafoveal retina when the expected pattern or existing findings indicate it. The Royal College of Ophthalmologists' 2020 revision did not recommend routine baseline testing and used OCT and fundus autofluorescence for routine monitoring. Institutions should adopt a coherent protocol and specify which service will interpret abnormalities. Repeat or corroborate an equivocal result before recommending discontinuation, because an unnecessary interruption can compromise systemic disease control. [19, 20, 22, 23]

Ethambutol. Toxic optic neuropathy may present with painless bilateral central blur, color disturbance, or a central field defect. The American Thoracic Society, CDC, and Infectious Diseases Society of America guideline describes baseline visual acuity and color discrimination tests with monthly symptom inquiry and color discrimination testing during therapy, based on expert opinion. An apparently normal disc or color plate test does not exclude early toxicity. Renal impairment and dosing should be reviewed with the tuberculosis team. New compatible symptoms require urgent eye assessment and immediate contact with the treating team so it can act on suspected toxicity while preserving an effective tuberculosis regimen. [24, 25]

Topiramate. Acute myopia and secondary angle closure are uncommon but potentially sight-threatening. Published case reports and series describe onset most often early after initiation. Ciliochoroidal effusion can move the lens and iris forward, narrowing the angle through a mechanism other than pupillary block. Sudden bilateral blur, halos, or ocular pain after exposure warrants emergency evaluation. The prescriber and eye clinician should coordinate prompt withdrawal and acute management when topiramate-induced angle closure is suspected. Case reports cannot establish the incidence of this complication. [26]

Corticosteroids and pentosan polysulfate. Steroid-induced IOP elevation can be asymptomatic. The risk depends on exposure and individual susceptibility, including a history of glaucoma. For patients requiring sustained or repeated ocular steroid treatment, the care plan should specify when IOP will be checked and who will act on a rise. Long-term pentosan polysulfate use is associated with a pigmentary maculopathy that can resemble AMD; reading difficulty or prolonged dark adaptation can occur despite relatively preserved acuity. The 2021 US label suggested a retinal examination including OCT and autofluorescence

within six months of initiation and periodically during treatment. It recommended assessment before starting in patients with pre-existing ophthalmic conditions. Progression after cessation has been described, so stopping the drug does not eliminate the need for retinal follow-up when toxicity is present. [27-30] Table 2 links each selected exposure to a monitoring or escalation decision.

Table 2. Selected medication-related ocular complications and recommended responses

Exposure and complication	Prevention or surveillance	Response to a concerning finding
Hydroxychloroquine: retinopathy. [19, 20, 23]	Review actual weight, dose, kidney function, and tamoxifen. Use the selected risk-based retinal protocol.	Corroborate equivocal tests; coordinate a decision with the prescriber after specialist assessment.
Ethambutol: optic neuropathy. [24, 25]	Document baseline acuity and color vision. Follow the tuberculosis program's monitoring schedule during therapy.	Urgently assess new central blur or color change and alert the tuberculosis team immediately.
Topiramate: acute myopia and angle closure. [26]	Counsel at initiation about sudden blur, halos, and pain, particularly early in treatment.	Refer for emergency assessment and notify the prescriber promptly.
Corticosteroids: ocular hypertension or glaucoma. [27]	Review prior glaucoma and steroid exposure. Set an IOP follow-up plan for sustained or repeated ocular treatment.	Confirm the pressure rise and review steroid and pressure-lowering therapy with the treating team.
Pentosan polysulfate: pigmentary maculopathy. [28-30]	Record duration and cumulative exposure. Arrange baseline and periodic retinal assessment.	Refer for retinal evaluation and discuss continued use with the prescriber. Monitor established toxicity after cessation.

IOP, intraocular pressure.

4. Discussion

The clinical benefit comes from connecting testing to decisions. Before a potentially toxic medicine is started, prescribing and eye care services should agree on the baseline examination, monitoring interval, and action for an abnormal result. At dispensing, pharmacy staff can reconcile the prescription with what the patient actually uses, including outside prescriptions and nonprescription drops. Evidence for medication reconciliation comes mostly from broader care settings. For ocular safety, its role is to give the eye clinician and prescriber a reliable exposure history. [31]

A shared record could include the medicine, indication, start date, current dose, relevant renal function, last completed examination, and due date. Optical and pharmacy technicians can support test preparation, data collection, dispensing checks, and follow-up within institutional protocols. An appropriately qualified clinician should validate findings and make treatment decisions. If a new product or concentration is dispensed during a supply disruption, the team should verify the dose and instructions and check that the patient knows which bottle to use. Suspected adverse reactions should be documented and reported through the Saudi Food and Drug Authority's pharmacovigilance process. The clinical record should identify the findings, timing, product, and actions taken. [32]

A service could measure the proportion of eligible high-risk prescriptions with surveillance completed by the due date and the proportion of abnormal or ungradable screens with a documented referral outcome. These measures give different information from a count of tests ordered. Review false alerts, waiting times, and avoidable interruptions of necessary treatment as balancing measures. When access is uneven, review completion by service location or patient group to identify where the pathway fails.

The literature supports individual components more directly than their combination. The glaucoma trials

enrolled selected patients. Hydroxychloroquine risk estimates depend on exposure and how intensively patients were screened. Evidence on uncommon adverse events, including topiramate-related angle closure and the course of pentosan maculopathy after cessation, includes case reports or small series. This targeted review did not formally grade certainty or cover every drug and patient population. Prospective evaluations should test whether a shared workflow improves timely action on abnormal findings and reduces preventable harm.

5. Conclusion

An integrated eye care pathway should distinguish among refractive problems, ocular disease, and medication toxicity before deciding on treatment. Good acuity does not replace retinal surveillance in diabetes or the assessment of a suspicious optic nerve. Drug-related complications require different responses: an equivocal hydroxychloroquine screen calls for corroboration and a joint treatment decision, while abrupt bilateral blur or pain after topiramate requires emergency assessment. When topical treatment is prescribed, the medicine's indication, systemic risks, and suitability for the patient's daily routine all matter.

The most practical starting point is a shared medication history and a monitoring plan with a named clinician responsible for acting on results. Eye care and pharmacy teams should verify that referrals are completed, patients can use the prescribed drops, and changes in medication are communicated to all treating services. Hospitals can evaluate this approach by tracking both timely follow-up and unwanted effects, such as unnecessary referrals or interruptions of effective therapy. Sustained improvement should be judged by whether patients receive appropriate care sooner and avoid preventable visual harm.

References

1. GBD 2019 Blindness and Vision Impairment Collaborators; Vision Loss Expert Group of the Global Burden of Disease Study. Causes of blindness and vision impairment in 2020 and trends over 30 years, and prevalence of avoidable blindness in relation to VISION 2020: the Right to Sight: an analysis for the Global Burden of Disease Study. Lancet Glob Health. 2021;9(2):e144-e160. doi: 10.1016/S2214-109X(20)30489-7
2. Chuck RS, Dunn SP, Flaxel CJ, Gedde SJ, Mah FS, Miller KM, et al. Comprehensive Adult Medical Eye Evaluation Preferred Practice Pattern®. Ophthalmology. 2021;128(1):P1-P29. doi: 10.1016/j.ophtha.2020.10.024
3. Kumar RS, Rackenchath MV, Sathidevi AV, Nagaraj S, Moe CA, Stamper RL, et al. Accuracy of pinhole visual acuity at an urban Indian hospital. Eye (Lond). 2019;33(2):335-337. doi: 10.1038/s41433-018-0237-6
4. Mac Grory B, Schrag M, Biousse V, Furie KL, Gerhard-Herman M, Lavin PJ, et al. Management of Central Retinal Artery Occlusion: A Scientific Statement From the American Heart Association. Stroke. 2021;52(6):e282-e294. doi: 10.1161/STR.0000000000000366
5. Hollands H, Johnson D, Brox AC, Almeida D, Simel DL, Sharma S. Acute-onset floaters and flashes: is this patient at risk for retinal detachment? JAMA. 2009;302(20):2243-9. doi: 10.1001/jama.2009.1714
6. Flaxel CJ, Adelman RA, Bailey ST, Fawzi A, Lim JI, Vemulakonda GA, et al. Age-Related Macular Degeneration Preferred Practice Pattern®. Ophthalmology. 2020;127(1):P1-P65. doi: 10.1016/j.ophtha.2019.09.024
7. American Diabetes Association Professional Practice Committee. 12. Retinopathy, Neuropathy, and Foot Care: Standards of Care in Diabetes-2024. Diabetes Care. 2024;47(Suppl 1):S231-S243. doi: 10.2337/dc24-S012
8. Mansberger SL, Sheppler C, Barker G, Gardiner SK, Demirel S, Wooten K, et al. Long-term Comparative Effectiveness of Telemedicine in Providing Diabetic Retinopathy Screening Examinations: A Randomized Clinical Trial. JAMA Ophthalmol. 2015;133(5):518-25. doi: 10.1001/jamaophthalmol.2015.1
9. Al-Rubeaan K, Abu El-Asrar AM, Youssef AM, Subhani SN, Ahmad NA, Al-Sharqawi AH, et al. Diabetic retinopathy and its risk factors in a society with a type 2 diabetes epidemic: a Saudi National Diabetes Registry-based study. Acta Ophthalmol. 2015;93(2):e140-7. doi: 10.1111/aos.12532

10. US Preventive Services Task Force. Screening for Primary Open-Angle Glaucoma: US Preventive Services Task Force Recommendation Statement. JAMA. 2022;327(20):1992-1997. doi: 10.1001/jama.2022.7013
11. European Glaucoma Society. European Glaucoma Society Terminology and Guidelines for Glaucoma, 5th Edition. Br J Ophthalmol. 2021;105(Suppl 1):1-169. doi: 10.1136/bjophthalmol-2021-egsguidelines
12. Kass MA, Heuer DK, Higginbotham EJ, Johnson CA, Keltner JL, Miller JP, et al. The Ocular Hypertension Treatment Study: a randomized trial determines that topical ocular hypotensive medication delays or prevents the onset of primary open-angle glaucoma. Arch Ophthalmol. 2002;120(6):701-13. doi: 10.1001/archopht.120.6.701
13. Gazzard G, Konstantakopoulou E, Garway-Heath D, Garg A, Vickerstaff V, Hunter R, et al. Selective laser trabeculoplasty versus eye drops for first-line treatment of ocular hypertension and glaucoma (LiGHT): a multicentre randomised controlled trial. Lancet. 2019;393(10180):1505-1516. doi: 10.1016/S0140-6736(18)32213-X
14. Morales DR, Dreischulte T, Lipworth BJ, Donnan PT, Jackson C, Guthrie B. Respiratory effect of beta-blocker eye drops in asthma: population-based study and meta-analysis of clinical trials. Br J Clin Pharmacol. 2016;82(3):814-22. doi: 10.1111/bcp.13006
15. Stone JL, Robin AL, Novack GD, Covert DW, Cagle GD. An objective evaluation of eyedrop instillation in patients with glaucoma. Arch Ophthalmol. 2009;127(6):732-6. doi: 10.1001/archophthalmol.2009.96
16. Reardon G, Kotak S, Schwartz GF. Objective assessment of compliance and persistence among patients treated for glaucoma and ocular hypertension: a systematic review. Patient Prefer Adherence. 2011;5:441-63. doi: 10.2147/PPA.S23780
17. Zimmerman TJ, Kooner KS, Kandarakis AS, Ziegler LP. Improving the therapeutic index of topically applied ocular drugs. Arch Ophthalmol. 1984;102(4):551-3. doi: 10.1001/archopht.1984.01040030429017
18. Gomes JAP, Azar DT, Baudouin C, Efron N, Hirayama M, Horwath-Winter J, et al. TFOS DEWS II iatrogenic report. Ocul Surf. 2017;15(3):511-538. doi: 10.1016/j.jtos.2017.05.004
19. Marmor MF, Kellner U, Lai TY, Melles RB, Mieler WF, American Academy of Ophthalmology. Recommendations on Screening for Chloroquine and Hydroxychloroquine Retinopathy (2016 Revision). Ophthalmology. 2016;123(6):1386-94. doi: 10.1016/j.ophtha.2016.01.058
20. Rosenbaum JT, Costenbader KH, Desmarais J, Ginzler EM, Fett N, Goodman SM, et al. American College of Rheumatology, American Academy of Dermatology, Rheumatologic Dermatology Society, and American Academy of Ophthalmology 2020 Joint Statement on Hydroxychloroquine Use With Respect to Retinal Toxicity. Arthritis Rheumatol. 2021;73(6):908-911. doi: 10.1002/art.41683
21. Melles RB, Jorge AM, Marmor MF, Zhou B, Conell C, Niu J, et al. Hydroxychloroquine Dose and Risk for Incident Retinopathy: A Cohort Study. Ann Intern Med. 2023;176(2):166-173. doi: 10.7326/M22-2453
22. Jorge AM, Melles RB, Marmor MF, Zhou B, Zhang Y, Choi HK. Risk Factors for Hydroxychloroquine Retinopathy and Its Subtypes. JAMA Netw Open. 2024;7(5):e2410677. doi: 10.1001/jamanetworkopen.2024.10677
23. Yusuf IH, Foot B, Lotery AJ. The Royal College of Ophthalmologists recommendations on monitoring for hydroxychloroquine and chloroquine users in the United Kingdom (2020 revision): executive summary. Eye (Lond). 2021;35(6):1532-1537. doi: 10.1038/s41433-020-01380-2
24. Nahid P, Dorman SE, Alipanah N, Barry PM, Brozek JL, Cattamanchi A, et al. Official American Thoracic Society/Centers for Disease Control and Prevention/Infectious Diseases Society of America Clinical Practice Guidelines: Treatment of Drug-Susceptible Tuberculosis. Clin Infect Dis. 2016;63(7):e147-e195. doi: 10.1093/cid/ciw376
25. Saxena R, Singh D, Phuljhele S, Kalaiselvan V, Karna S, Gandhi R, et al. Ethambutol toxicity: Expert panel consensus for the primary prevention, diagnosis and management of ethambutol-induced optic neuropathy. Indian J Ophthalmol. 2021;69(12):3734-3739. doi: 10.4103/ijo.IJO_3746_20
26. Al Owaifeer AM, AlSultan ZM, Badawi AH. Topiramate-induced acute angle closure: A systematic review of case reports and case series. Indian J Ophthalmol. 2022;70(5):1491-1501. doi: 10.4103/ijo.IJO_2134_21
27. Kersey JP, Broadway DC. Corticosteroid-induced glaucoma: a review of the literature. Eye (Lond). 2006;20(4):407-16. doi: 10.1038/sj.eye.6701895

28. Hanif AM, Armenti ST, Taylor SC, Shah RA, Igelman AD, Jayasundera KT, et al. Phenotypic Spectrum of Pentosan Polysulfate Sodium-Associated Maculopathy: A Multicenter Study. JAMA Ophthalmol. 2019;137(11):1275-1282. doi: 10.1001/jamaophthalmol.2019.3392
29. Janssen Pharmaceuticals, Inc. Elmiron (pentosan polysulfate sodium) capsules: prescribing information. Titusville (NJ): Janssen Pharmaceuticals, Inc.; 2021 Feb. Available from: FDA prescribing information
30. Shah R, Simonett JM, Lyons RJ, Rao RC, Pennesi ME, Jain N. Disease Course in Patients With Pentosan Polysulfate Sodium-Associated Maculopathy After Drug Cessation. JAMA Ophthalmol. 2020;138(8):894-900. doi: 10.1001/jamaophthalmol.2020.2349
31. Mueller SK, Sponsler KC, Kripalani S, Schnipper JL. Hospital-based medication reconciliation practices: a systematic review. Arch Intern Med. 2012;172(14):1057-69. doi: 10.1001/archinternmed.2012.2246
32. Saudi Food and Drug Authority. Guidance on adverse drug events reporting for healthcare professionals. Version 1.0. Riyadh: Saudi Food and Drug Authority; 2022 Aug 21. Available from: SFDA guidance