Journal of Pioneering Medical Sciences
Received: December 12, 2025 | Accepted: February 25, 2026 | Published: April 05, 2026
Volume 15, Issue 03, Pages 07-13

DOI https://doi.org/10.47310/jpms2026150302

The Relationship Between Income Deciles, Insurance Type, and Prevalence of Ocular Diseases in Iran: A Cross-Sectional Study

Shiva Onegh[1], Shaghayegh Vahdat[2*], Shahram Tofighi[3] and Somayeh Hessam[4]
[1,2,4]Department of Health Service Administration, ST.C., Islamic Azad University, Tehran, Iran
[3]Department of Forecasting, Theory Building and Health Observatory, Medical Academy of IRI, Tehran, Iran

Author Designation: [1]PhD Student, [2,3,4]Associate Professor

*Corresponding author: Shaghayegh Vahdat (e-mail: sha_vahdat@iau.ac.ir).

Abstract: Background: Ocular diseases, including cataracts, retinal disorders, iris and ciliary body disorders, nasolacrimal duct obstruction, pterygium, and glaucoma, represent some of the most prevalent eye conditions in Iran. **Objective:** This study aimed to investigate the relationship between income deciles, insurance type, and the prevalence of major ocular diseases. **Methods**: This cross-sectional study was conducted between 2023 and 2024, with approval from the university ethics committee. Data were extracted from electronic health records of patients diagnosed with ocular diseases at selected hospitals in Iran. The diseases included cataracts, retinal disorders, iris and ciliary body disorders, pterygium, nasolacrimal duct obstruction, and glaucoma. Data were compiled in Excel. Statistical analyses were performed using chi-square and Fisher's exact tests in SPSS version 26. **Results:** The most frequently diagnosed ocular diseases were cataracts (67.4%), retinal disorders (12.4%), iris and ciliary body disorders (11.1%), pterygium (5.2%), nasolacrimal duct obstruction (2.9%), and glaucoma (1.0%). Prevalence was significantly higher in the lower income deciles (1–3) for cataracts, retinal disorders, pterygium, nasolacrimal duct obstruction, and glaucoma. In contrast, iris and ciliary body disorders showed higher prevalence in the middle-income deciles (4–7). Both chi-square and Fisher's exact tests confirmed significant associations between income level, insurance type, and the prevalence of these ocular diseases ($p<0.05$). **Conclusion**: The disproportionately high burden of ocular diseases among lower-income groups underscores socioeconomic disparities and barriers to healthcare access. Targeted policies to expand insurance coverage, promote regular eye screenings, and improve access to preventive and therapeutic eye care are essential to reduce these inequities.

Key Words: Ocular Diseases, Socioeconomic Factors, Income Deciles, Health Insurance

INTRODUCTION

Ocular diseases significantly impair quality of life and impose a substantial burden on healthcare systems worldwide [1]. In low- and middle-income countries, socioeconomic disparities limit equitable access to eye care services [2], particularly for low-income and rural populations facing high treatment costs, limited specialized facilities, inadequate preventive awareness, a shortage of trained ophthalmic personnel, suboptimal skills among healthcare workers, and poor care quality [3,4]. These barriers frequently result in delayed diagnosis, inadequate treatment, and preventable vision impairment or blindness [1].

The World Health Organization (WHO) emphasizes improving access, increasing service utilization, and monitoring equity to achieve universal health coverage [5]. As populations age and costly medical technologies proliferate, governments must prioritize equitable eye care access while managing financial pressures on healthcare systems [6]. In Iran, the health insurance system includes the Social Security Organization, the Iran Health Insurance Organization (covering employees, rural residents, and other population groups), the Relief Committee, and various other organizational insurances [7]. The type of insurance coverage significantly influences individuals' access to healthcare services. Despite a universal basic benefit package under the Social Health Insurance Fund, disparities in health financing and access persist [8].

Healthcare inequities in eye care threaten public well-being, affecting the prevalence and treatment of conditions such as glaucoma, cataracts, and diabetic retinopathy, as well as access to surgical interventions, spectacle prescriptions,

and specialist referrals. These inequities are influenced by demographic factors, including gender, race, ethnicity, geography, and age [9]. Uninsured or low-income individuals are less likely to utilize ophthalmic services. Therefore, expanding community-based eye care programs, addressing social determinants of health, and eliminating bias and discrimination in healthcare delivery are essential steps toward promoting equity [10].

Approximately 90% of individuals with ocular disorders reside in developing countries, where cataracts, refractive errors, diabetic retinopathy, and glaucoma are the leading causes of visual impairment among older adults, with prevalence expected to rise [11,12]. Low income is strongly associated with higher ocular disease risk, as shown by studies in India and China demonstrating greater cataract susceptibility in lower-income individuals due to limited healthcare access [13,14]. Environmental factors (e.g., ultraviolet radiation, poor nutrition, chronic stress) and economic determinants also contribute to the prevalence of common ocular diseases [15]. These disorders impair quality of life, reduce employment opportunities, exacerbate poverty, and impose a significant socioeconomic burden on communities, driven by rising healthcare costs and an aging population [16].

Despite documented socioeconomic disparities in eye care services in Iran, the combined effect of income deciles and health insurance type on the prevalence of specific ocular conditions remains under-investigated. This cross-sectional study aims to address this gap by analyzing hospital-based data to examine the relationship between socioeconomic factors and major ocular diseases.

The Present Study was Conducted to

- Evaluate the association between income deciles and health insurance status and the prevalence of major ocular diseases (cataract, retinal disorders, disorders of iris and ciliary body, pterygium, nasolacrimal duct obstruction, and glaucoma) among patients attending the hospital
- Generate evidence to support policy development aimed at reducing inequalities in access to ophthalmic care in Iran

METHODS

This retrospective cross-sectional study was conducted between 2023 and 2024 across selected hospitals in Iran. The study protocol was approved by the Research Ethics Committee of Islamic Azad University, Central Tehran Branch (Ethics Code: IR.IAU.CTB.REC.1402.008) and conducted in accordance with the Declaration of Helsinki. The research forms part of a PhD dissertation. All data were extracted anonymously from patients' electronic health records (EHRs) in full compliance with institutional ethical guidelines. As the dataset was completely de-identified to protect patient confidentiality, the Ethics Committee waived the requirement for written informed consent.

Following on-site visits to the participating hospitals, records of 17,227 patients diagnosed with ocular diseases were identified and retrieved from the hospitals' EHR systems using relevant International Classification of Diseases, 10th Revision (ICD-10) codes. The extracted data were then transferred to and organized in Microsoft Excel spreadsheets for analysis.

Income decile data were available only for 7,240 patients covered by the Iran Health Insurance Organization (including Iranian, Rural, Government Employee, and "Other Strata" insurances). Access to income deciles for the remaining patients was restricted due to legal regulations, policies, and institutional limitations imposed by the Iranian Welfare Database (affiliated with the Ministry of Cooperatives, Labour and Social Welfare), as well as the absence of permission from this organization to access such data for individuals covered by Social Security insurance. Consequently, the final analysis was limited to complete-case analysis (including only cases with complete income data), with no additional exclusion criteria applied.

Ocular conditions were classified into six major diagnostic categories: cataract (n = 4,882), retinal disorders (n = 897), iris and ciliary body disorders (n = 805), pterygium (n = 373), nasolacrimal duct obstruction (n = 208), and glaucoma (n = 75) (Table 1).

These cases were subsequently classified based on patients' income deciles—low (deciles 1–3), middle (deciles 4–7), and high (deciles 8–10)—and by type of insurance coverage (Iranian, Rural, "Other Strata", and Government Employee insurance) (Table 2). Statistical analyses were performed using SPSS version 26. The chi-square test was used to assess associations between categorical variables. For datasets with small expected cell counts (e.g., those related to glaucoma), Fisher's exact test was applied. A p-value<0.05 was considered statistically significant.

Table 1: Distribution of Six Selected Ocular Diseases by Income Decile

Disease Name	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Grand Total
Cataract	1501	601	438	494	318	357	336	351	282	204	4882
Retinal Disorders	201	131	112	103	55	83	60	58	51	43	897
Iris and Ciliary Body Disorders	41	68	47	125	87	100	122	108	62	45	805
Pterygium	119	80	57	36	13	15	14	21	10	8	373
Nasolacrimal Duct Obstruction	57	37	27	22	12	9	11	15	11	7	208
Glaucoma	12	15	6	7	6	11	5	10	1	2	75
Grand Total	1931	932	687	787	491	575	548	563	417	309	7240

Table 2: Distribution of Six Ocular Diseases by Income Decile and Insurance Type

Disease	Income Decile	Iranian Insurance	Rural Insurance	Other Strata Insurance	Government Employee Insurance	Grand Total (%)
Cataract (Prevalence 67.4%)	Low (1-3)	16.2%	25.3%	24.47%	5.27%	17.81
	Middle (4-7)	7.33%	4.4%	5.05%	12.7%	7.37
	High (8-10)	7.33%	2.13%	2.13%	11.17%	5.69
Retinal Disorders (Prevalence 12.4%)	Low (1-3)	21.2%	22.2%	24.2%	6.6%	18.55
	Middle (4-7)	5.03%	5.43%	6.6%	13.2%	7.57
	High (8-10)	5.43%	3.9%	0.43%	9.2%	4.74
Iris and Ciliary Body Disorders (Prevalence 11.1%)	Low (1-3)	0.0%	0.0%	14.23%	4.67%	4.73
	Middle (4-7)	0.0%	0.0%	9.68%	14.35%	6.01
	High (8-10)	0.0%	0.0%	6.2%	9.53%	3.93
Pterygium (Prevalence 5.2%)	Low (1-3)	26.33%	25.1%	26.53%	7.2%	21.29
	Middle (4-7)	3.98%	4.55%	2.28%	11.75%	5.64
	High (8-10)	1.77%	2.2%	3.8%	10.47%	4.56
Nasolacrimal Duct Obstruction (Prevalence 2.9%)	Low (1-3)	16.7%	24.7%	21.4%	6.4%	17.3
	Middle (4-7)	6.3%	3.9%	5.4%	13.0%	7.2
	High (8-10)	8.3%	3.3%	4.8%	9.6%	6.5
Glaucoma (Prevalence 1.0%)	Low (1-3)	22.2%	29.6%	13.5%	10.8%	19.0
	Middle (4-7)	8.3%	2.8%	11.7%	9.7%	8.1
	High (8-10)	0.0%	0.0%	4.2%	9.7%	3.5

RESULTS

Cataracts

Cataracts, the most prevalent ocular disease, comprised 4,882 cases (67.4% of total cases; Table 1). Prevalence demonstrated a clear inverse relationship with income level, with substantially higher rates in low-income groups (deciles 1–3) and a progressive decrease in middle- (deciles 4–7) and high-income groups (deciles 8–10). Marked insurance-related disparities were evident across income strata. In low-income groups, Rural and "Other Strata" insurance types were associated with the highest proportions, whereas Government Employee insurance showed the lowest. In contrast, proportions were notably higher among individuals with Government Employee and Iranian insurance in both middle- and high-income groups than in those with Rural and "Other Strata" types (Table 2). The chi-square test (χ^2 = 1558.09 >40.113, df = 27, p<0.05) confirmed a significant association between income deciles, insurance type, and cataract prevalence.

Retinal Disorders

Retinal disorders, the second most prevalent ocular disease, comprised 897 cases (12.4% of total cases; Table 1). Prevalence demonstrated a clear inverse relationship with income level, with substantially higher rates in low-income groups (deciles 1–3) and a progressive decline through middle- (deciles 4–7) to high-income groups (deciles 8–10). Marked insurance-related disparities were evident across income strata. In low-income groups, "Other Strata", Rural, and Iranian insurance types were associated with the highest proportions, whereas Government Employee insurance showed the lowest. In contrast, proportions were notably higher among individuals with Government Employee insurance in both middle- and high-income groups, while Rural and "Other Strata" types generally exhibited lower proportions, particularly in the high-income category (Table 2). The chi-square test (χ^2 = 144.37 > 40.113, df = 27, p<0.05) demonstrated a significant association between income level, insurance type, and the occurrence of retinal disorders.

Iris and Ciliary Body Disorders

Iris and ciliary body disorders, the third most prevalent ocular condition, comprised 805 cases (11.1% of total cases; Table 1). In contrast to the pattern seen in cataracts and retinal disorders, prevalence did not exhibit a clear inverse relationship with income level, being highest in middle-income groups (deciles 4–7), followed by low-income groups (deciles 1–3), and lowest in high-income groups (deciles 8–10). Marked insurance-related disparities were evident across income strata. In low-income groups, "Other Strata" insurance was associated with the highest proportions, whereas Government Employee insurance showed the lowest. In middle-income groups, Government Employee and "Other Strata" insurance types had the highest proportions. In high-income groups, Government Employee insurance again exhibited the highest proportions, followed by "Other Strata". Notably, no cases were recorded in individuals covered by Iranian or Rural insurance across all income deciles (Table 2). This absence in these categories may reflect diagnostic, access, or reporting limitations rather than an actual absence of the condition. The chi-square test (χ^2 = 103.92 > 16.91, df = 9, P<0.05) indicated a statistically significant association between income level, insurance type, and the incidence of iris and ciliary body disorders.

Pterygium

Pterygium, the fourth most common ocular disease, comprised 373 cases (5.2% of total cases; Table 1). Prevalence showed a clear inverse relationship with income level, with substantially higher rates in low-income groups (deciles 1–3) compared to middle- (deciles 4–7) and high-income groups (deciles 8–10). Marked insurance-related disparities were evident across income strata. In low-income groups, "Other Strata", Iranian, and Rural insurance types were associated with the highest proportions, whereas Government Employee insurance exhibited the lowest. In middle-income groups, Government Employee insurance showed notably higher proportions compared to the other types. In high-income groups, Government Employee

insurance again had the highest proportions, followed by "Other Strata", with Rural and Iranian insurance types showing the lowest (Table 2). The chi-square test (χ^2 = 117.46 > 40.113, df = 27, P<0.05) confirmed a significant association between income decile, insurance type, and the incidence of pterygium.

Nasolacrimal Duct Obstruction

Nasolacrimal duct obstruction, the fifth most prevalent ocular disease, comprised 208 cases (2.9% of total cases; Table 1). Prevalence exhibited a clear inverse relationship with income level, with substantially higher rates in low-income groups (deciles 1–3) compared to middle- (deciles 4–7) and high-income groups (deciles 8–10). Marked insurance-related disparities were evident across income strata. In low-income groups, Rural and "Other Strata" insurance types were associated with the highest proportions, followed by Iranian insurance, whereas Government Employee insurance showed the lowest. In middle-income groups, Government Employee insurance exhibited notably higher proportions compared to the other types. In high-income groups, Government Employee and Iranian insurance types had the highest proportions, while Rural and "Other Strata" showed the lowest (Table 2). The chi-square test (χ^2 = 77.63 >40.113, df = 27, p<0.05) demonstrated a significant relationship between income decile, insurance type, and nasolacrimal duct obstruction.

Glaucoma

Glaucoma, the least prevalent of six ocular diseases, comprised 75 cases (1.0% of total cases; Table 1). Prevalence demonstrated a clear inverse relationship with income level, with substantially higher rates in low-income groups (deciles 1–3) and a progressive decrease in middle- (deciles 4–7) and high-income groups (deciles 8–10). Marked insurance-related disparities were evident across income strata. In low-income groups, Rural and Iranian insurance types showed the highest proportions, followed by "Other Strata" and Government Employee insurance. In middle-income groups, "Other Strata", Government Employee, and Iranian insurance types exhibited the highest proportions, whereas Rural insurance showed the lowest. In high-income groups, Government Employee insurance had the highest proportions, followed by "Other Strata"; notably, no cases were recorded among individuals with Iranian or Rural insurance (Table 2). Due to the small number of glaucoma cases, Fisher's exact test was employed, confirming a statistically significant association between income decile, insurance type, and glaucoma prevalence (p = 0.039<0.05). These findings suggest that limited access to diagnostic and therapeutic services in lower-income populations may contribute to the higher burden of glaucoma observed in these groups.

DISCUSSION

This study identified cataracts, retinal disorders, iris and ciliary body disorders, pterygium, nasolacrimal duct obstruction, and glaucoma as the most prevalent ocular diseases in Iran. Cataracts, retinal disorders, pterygium, nasolacrimal duct obstruction, and glaucoma exhibited a clear inverse association with income level, with substantially higher prevalence in lower-income deciles (17.8–21.3%) compared to higher-income deciles (3.5–6.5%). In contrast, iris and ciliary body disorders showed a distinct pattern, peaking in middle-income deciles.

Insurance types primarily serving lower-income populations (Iranian, Rural, and "Other Strata" insurance) were consistently associated with a higher disease burden in low-income deciles. In contrast, Government Employee insurance showed elevated prevalence in middle- and high-income deciles—likely due to better access to diagnostic services in these groups. Overall, these findings underscore socioeconomic inequalities and disparities in access to preventive, diagnostic, and therapeutic eye care services as the primary drivers of the uneven distribution of ocular diseases in Iran.

Cataracts remain the leading cause of blindness in low- and middle-income countries, affecting an estimated 95 million people globally [17]. This condition was the most prevalent ocular disease identified in this study, showing a significant inverse association with income deciles and insurance type. Prevalence decreased progressively from the lowest to the highest income levels. This pattern highlights the pivotal role of socioeconomic status in access to timely eye care and early intervention. In middle- and high-income deciles, individuals with Government Employee insurance exhibited higher prevalence—likely reflecting greater health literacy, more comprehensive coverage, and routine access to eye examinations that enable earlier detection. Conversely, beneficiaries of Rural and "Other Strata" insurance in low-income deciles experienced a disproportionately high disease burden, attributable to limited access to surgical services, lower awareness, and greater environmental risk factors such as ultraviolet radiation exposure. These findings align with Summersingh *et al.* [13], who noted higher cataract prevalence in low-income rural Indian populations due to limited healthcare and UV exposure, and an Ethiopian survey linking higher income to increased eye care use [18]. Fachir *et al.* [19] further confirmed that health insurance enhances access to cataract surgery, emphasizing its role in vision-restoring care.

Retinal disorders (e.g., diabetic retinopathy) are major contributors to global visual impairment, driven by aging populations and rising diabetes rates [20]. This condition was the second most prevalent ocular disease identified in this study, showing a significant inverse association with income deciles and insurance type, with prevalence highest in the lowest income deciles and declining steadily toward higher-income groups. In higher-income deciles, patients with Government Employee insurance exhibited relatively higher prevalence, likely attributable to improved diagnostic access, routine screening, and earlier detection facilitated by comprehensive coverage. In contrast, the disease burden was markedly higher in lower-income deciles— particularly

among individuals with Rural, Iranian, and "Other Strata" insurance—due to delayed diagnosis, suboptimal diabetes management, and inadequate screening infrastructure. These patterns align with international evidence. Sully *et al.* [21] reported greater susceptibility to retinal conditions in socioeconomically disadvantaged areas. At the same time, U.S. studies have shown that Medicaid-insured patients face a higher risk of vision-threatening diabetic retinopathy compared to those with private insurance [22]. Although insurance coverage enhances access, disparities persist when coverage scope and quality remain unaddressed [20].

Iris and ciliary body disorders were the third most prevalent ocular diseases identified in this study. A statistically significant association was observed between the prevalence, income deciles, and insurance type. Prevalence showed a non-linear pattern: it increased from 4.73% in the lowest income deciles to 6.01% in middle-income deciles, then declined to 3.93% in the highest deciles. This pattern likely reflects higher diagnostic rates in middle-income groups—particularly among those with Government Employee insurance— combined with more effective preventive measures in higher-income populations. The absence of a consistent decreasing trend across income groups suggests that additional factors, such as health-seeking behavior and healthcare access, may play a role in shaping the distribution. Government Employee and "Other Strata" insurance was represented across all income deciles, with the highest prevalence occurring among Government Employee insurance holders in the middle-income group. This is probably attributable to better coverage, greater health literacy, and more routine ocular examinations. Global studies support the link between higher income and increased utilization of ophthalmologic services [23].

In contrast, the elevated prevalence among "Other Strata" insurance beneficiaries in low-income deciles may be linked to greater environmental risk exposure or lower disease awareness. A Polish study underscored that limited awareness of risk factors, infrequent eye examinations, and inadequate health education contribute to delayed diagnosis and treatment of ocular diseases [24]. The absence of reported cases among Iranian and Rural insurance beneficiaries across all income deciles most likely reflects diagnostic or reporting limitations rather than a genuine lack of disease. These observations highlight the urgent need to strengthen diagnostic capabilities, treatment infrastructure, and public awareness programs, particularly in low-income and underserved groups.

Pterygium and nasolacrimal duct obstruction ranked as the fourth and fifth most prevalent ocular diseases in this study, respectively. Their prevalence demonstrated a significant inverse association with income deciles and insurance type, decreasing markedly from the lowest to the highest deciles.

For pterygium, elevated rates in low-income deciles were observed among individuals with "Other Strata", Iranian, and Rural insurance—likely reflecting greater exposure to environmental risk factors (particularly UV radiation) and limited access to preventive measures. Conversely, Government Employee insurance exhibited the highest prevalence in high-income deciles, suggesting that occupational factors (e.g., prolonged outdoor work) may persist as significant contributors even among better-insured populations. These findings align with regional evidence; Chowdhury *et al.* [25] in Bangladesh emphasized the protective effects of sun avoidance behaviors and the use of hats or sunglasses. The lower prevalence in middle- and high-income groups likely reflects greater access to such protective measures and higher health awareness.

Nasolacrimal duct obstruction showed markedly higher prevalence in low-income deciles—particularly among individuals with Rural insurance—highlighting the strong link between socioeconomic disadvantage, poor ocular hygiene, limited access to preventive care, and inadequate sanitation practices. In contrast, lower prevalence in middle- and high-income groups aligns with better hygiene behaviors, higher health literacy, and greater access to medical services. These observations are consistent with prior research; Surendrapf *et al.* [26] in India reported higher rates of nasolacrimal duct obstruction among lower socioeconomic groups (e.g., farmers, laborers, and the unemployed), attributing the pattern to limited awareness of eye hygiene and restricted healthcare access.

Overall, these findings strongly support the implementation of targeted public health interventions to promote ocular hygiene education, improve sanitation infrastructure, enhance ophthalmic care accessibility, and provide affordable preventive tools (such as UV-protective eyewear) for high-risk groups, particularly in low-income and rural communities.

Glaucoma ranked as the sixth most common ocular disease in this study. A significant association was observed between its prevalence, income deciles, and insurance type. Prevalence showed a clear inverse relationship with income level, decreasing markedly from the lowest to the highest deciles. The appreciably higher prevalence in low-income deciles—particularly among Rural and Iranian insurance beneficiaries—likely reflects limited access to diagnostic services, routine screening, and timely ophthalmic care. In contrast, lower prevalence in high-income deciles is probably attributable to better access to advanced care and preventive measures. However, the relatively higher prevalence among Government Employee insurance holders in high-income deciles may stem from greater health literacy, disease awareness, and more frequent diagnostic evaluations. These patterns are consistent with existing literature. Shin-Ah Oh *et al.* [27] reported that lower income and education attainment are associated with increased glaucoma risk. Ramdas *et al.* [28] further demonstrated that higher income and education correlate with greater healthcare awareness and utilization, leading to earlier detection and management. Overall, the findings underscore the urgent need for targeted glaucoma screening programs in low-income and underserved populations, as well as enhanced monitoring of high-risk

groups (particularly in deprived areas and among older individuals) to facilitate early diagnosis and reduce vision loss.

Limitations

Income decile information was unavailable for a subset of the 17,227 patients, potentially introducing bias and limiting findings' generalizability. Genetic predispositions and environmental risk factors were not examined, limiting the scope of causal inferences. Future research should include these variables to better understand ocular diseases' multifactorial nature.

CONCLUSIONS

The higher prevalence of ocular diseases among lower-income deciles in Iran highlights persistent socioeconomic inequalities and barriers to accessing eye healthcare services. To address these disparities, targeted policy interventions are essential, including expansion of insurance coverage, promotion of regular eye screenings, and improved access to preventive and therapeutic eye care. Comprehensive eye health strategies—encompassing health promotion, prevention, treatment, and rehabilitation—should be systematically integrated into national health plans, development policies, health financing mechanisms, and workforce planning. Coordinated intersectoral efforts are crucial to strengthen population eye health through initiatives such as healthy aging programs, school-based vision screening, and workplace wellness schemes. Ultimately, embedding eye health services at all levels of the healthcare system is fundamental to achieving equitable and sustainable eye care outcomes for the Iranian population.

Conflict of Interest

The authors declare no conflict of interest. All authors read and approved the final version of the paper.

Acknowledgments

The authors acknowledge the officials and staff at Golestan University of Medical Sciences, Iran, and experts from the Health Information Technology and Management Units of the hospitals for their valuable contributions to this study.

REFERENCES

[1] Liao, J. *et al.* "The decline of basic ophthalmology in general medical education: a scoping review and recommended potential solutions." *Journal of Medical Education and Curricular Development*, vol. 11, 2024, pp. 23821205241245635.

[2] The International Council of Ophthalmology. "Medical student." 2025.

[3] L., J. "The importance of ophthalmology teaching." *British Columbia Medical Journal*, vol. 63, no. 1, 2021, pp. 34–36.

[4] Divya, K. *et al.* "Needs assessment of ophthalmology education for undergraduate medical students - a study from a medical college in South India." *Education for Health*, vol. 30, no. 3, 2017, pp. 223–227.

[5] Uhr, J.H. *et al.* "Training in and comfort with diagnosis and management of ophthalmic emergencies among emergency medicine physicians in the United States." *Eye*, vol. 34, no. 9, 2020, pp. 1504–1511.

[6] Dixitha, V., Babu, M. and Sabhahit, S.V. "A study on knowledge, attitude, and practices toward ophthalmic emergencies among fresh medical graduates in India." *Oman Journal of Ophthalmology*, vol. 17, no. 1, 2024, pp. 65–71.

[7] Jafari, A.K. *et al.* "Different causes of referral to ophthalmology emergency room." *Journal of Emergencies, Trauma, and Shock*, vol. 5, no. 1, 2012, pp. 16–22.

[8] Alrawashdeh, H.M. *et al.* "Trends in hospital admission due to diseases of the eye and adnexa in the past two decades in England and Wales: an ecological study." *International Journal of General Medicine*, vol. 15, 2022, pp. 1097–1110.

[9] Hassanin, F.F. *et al.* "Eye and adnexa hospitalization in Australia: an ecological study." *Medicine*, vol. 103, no. 27, 2024, pp. e38829.

[10] Naqeeb, M.R. and Naser, A.Y. "Postprocedural disorders of eye and adnexa admissions profile." *Clinical Optometry*, vol. 15, 2023, pp. 261–270.

[11] Hersi, R.M. *et al.* "Knowledge and attitude toward eye disorders in children among pediatricians and family physicians: a survey study." *BMC Ophthalmology*, vol. 23, no. 1, 2023, pp. 90.

[12] Naser, A.Y. *et al.* "Knowledge and awareness of the general population and healthcare providers about retinoblastoma: it is time to know the glow." *International Journal of Clinical Practice*, vol. 75, no. 8, 2021, pp. e14298.

[13] Committee on Practice and Ambulatory Medicine *et al.* "Eye examination in infants, children, and young adults by pediatricians." *Pediatrics*, vol. 111, no. 4, 2003, pp. 902–907.

[14] Abuallut, I. *et al.* "Assessment of ophthalmology teaching and its impact on the choice of future specialties among medical students of Jazan University." *Cureus*, vol. 15, no. 11, 2023.

[15] Davis, D.A. *et al.* "Accuracy of physician self-assessment compared with observed measures of competence: a systematic review." *JAMA*, vol. 296, no. 9, 2006, pp. 1094–1102.

[16] Patel, H. *et al.* "A need for standardization in visual acuity measurement." *Arquivos Brasileiros de Oftalmologia*, vol. 80, no. 5, 2017, pp. 332–337.

[17] Vivekanand, U., Gonsalves, S. and Bhat, S.S. "Is LEA symbol better compared to Snellen chart for visual acuity assessment in preschool children?" *Romanian Journal of Ophthalmology*, vol. 63, no. 1, 2019, pp. 35–37.

[18] Alqahtani, T.F. *et al.* "Knowledge, attitude, and practice regarding diabetic retinopathy screening and eye management among diabetics in Saudi Arabia." *Cureus*, vol. 15, no. 9, 2023, pp. e46190.

[19] Alharbi, M.M. *et al.* "Medical students' knowledge, attitudes, and practices concerning diabetes-related retinopathy." *Journal of Family Medicine and Primary Care*, vol. 9, no. 2, 2020, pp. 1058–1064.

[20] Esparaz, E.S. *et al.* "How prepared are medical students to diagnose and manage common ocular conditions." *Journal of Educational Evaluation for Health Professions*, vol. 11, 2014, pp. 29.

[21] Al-Omari, R. *et al.* "Evaluating the impact of undergraduate ophthalmology education on medical students' competency in eye care: A cross-sectional study in Jordan." *BMC Medical Education*, vol. 25, no. 1, 2025, pp. 266.

[22] MacLean, K. and Hindman, H.B. "UR well eye care: A model for medical student ophthalmology education and service in the community." *Clinical Ophthalmology*, vol. 8, 2014, pp. 2397–2401.

[23] Donkin, R. *et al.* "Online case-based learning in medical education: A scoping review." *BMC Medical Education*, vol. 23, no. 1, 2023, pp. 564.

[24] Gade, S. and Chari, S. "Case-based learning in endocrine physiology: An approach toward self-directed learning and the development of soft skills in medical students." *Advances in Physiology Education*, vol. 37, no. 4, 2013, pp. 356–360.

[25] Thistlethwaite, J.E. *et al.* "The effectiveness of case-based learning in health professional education: a BEME systematic review (guide no. 23)." *Medical Teacher*, vol. 34, no. 6, 2012, pp. e421–e444.