Original Article

Family Physicians' Approach to Sight Threatening Conditions in Children: Awareness, Management, and Referral Methods

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ABSTRACT

Purpose: To evaluate the knowledge and attitude of Iraqi family physicians regarding pediatric sight threatening diseases and to identify factors influencing their approaches.

Study Design: Cross sectional, Observational study.

Place and Duration of Study: Primary health care centers of Iraq, from March 2024 to March 2025.

Methods: This study included 385 family physicians working in primary health care centers. Participants completed a structured, self-administered, web-based survey distributed via social media groups. The survey included demographic questions and assessed knowledge and attitudes toward common pediatric eye disorders. Data was analyzed using SPSS version 22.

Results: Among the participants, 55.3% were residents. Knowledge varied significantly with 51.6% demonstrating good knowledge, 67.5% moderate, and 81% poor. Family medicine consultants exhibited the highest knowledge levels (78.4% "good"), compared to specialists (68.1%) and residents (10.3%). Physicians with less than one year of experience showed the most significant knowledge gaps (p=0.000). Attitudes toward pediatric eye care were generally positive, but knowledge deficiencies hindered effective practice.

Conclusion: The study reveals substantial knowledge gaps among Iraqi family physicians, particularly among residents and those with limited clinical experience. Experience and professional role strongly correlated with higher knowledge levels. To address preventable childhood vision impairment, targeted educational interventions, like structured training programs, mentorship, and the integration of pediatric ophthalmology into family medicine curricula, are urgently needed. These efforts could significantly reduce the burden of preventable vision loss in children.

Keywords: Leukocoria, Congenital Cataract, Retinopathy of Prematurity, Pediatrician.

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INTRODUCTION

Sight-threatening disorders are common in children, making early detection and intervention by first-contact physicians critical. Family physicians play a pivotal role in identifying these conditions, yet their knowledge and attitudes toward pediatric eye disorders remain understudied, particularly in low-resource settings like Iraq. Pediatric eye disorders represent a broad spectrum of conditions, ranging from common refractive errors to more severe diseases like retinoblastoma, and affect a considerable proportion of the pediatric population.[1] Nearly 20% of children under 18 years are affected by these disorders, which can have lasting effects on vision, academic performance, and overall quality of life.[2] Early identification is crucial to minimize long-term complications, making awareness of their prevalence,

risk factors, and clinical presentation essential for healthcare providers. Pediatric eye disorders are a notable public health issue, with about 6.7% of children under 19 affected, as shown in data from the Optum Lab Data Warehouse, with variations observed based on race/ethnicity, geographic region, and socioeconomic status.[3] Their development is influenced by genetics, prenatal and birth-related factors, and environmental exposures after birth. A family history of conditions like myopia or amblyopia increases risk, while infections or harmful substance use during pregnancy can interfere with normal eye development.[4] Birth complications such as fetal distress may also play a role.[5] Postnatal factors like excessive screen time, certain medications, and underlying health conditions, especially neurological or autoimmune disorders, prior ocular trauma or surgery, can further elevate the risk.[6] These conditions arise due to a combination of genetic predisposition, prenatal and perinatal influences, and postnatal environmental and behavioral factors.

Recognizing this complexity, the American Optometric Association recommends comprehensive eye examinations starting as early as 6 months of age, with follow-up exams at ages 3–5 years and annually from age 6 to 17 years.[7] Family physicians play a vital role in the early detection and prevention of pediatric vision problems, particularly through routine vision screenings and educational outreach. Their involvement extends to public health efforts, including partnerships with schools and community programs to raise awareness about the importance of early vision care.[8]

Despite their importance, vision screening in primary care settings faces multiple barriers. Time limitations, lack of access to specialized equipment, and the need for physician training hinder implementation.[9] Additionally, parental factors, such as limited knowledge of vision health or missed appointments, further complicate early diagnosis. Inconsistent guidelines and screening protocols also create uncertainty for healthcare providers.[10] Overcoming these obstacles requires a coordinated effort among healthcare professionals, policymakers, and communities to ensure that every child receives timely and effective vision care.

This study was designed to find out the knowledge and attitude of Iraqi family physicians regarding pediatric sight threatening diseases and to identify factors influencing their approaches. The study will help policy makers, media workers and physicians in improving ocular health among Iraqi population.

METHODS

This descriptive, observational, cross-sectional study was conducted for one year from March 2024 through March 2025 and focused on family physicians in Iraq working at primary health care centers. The study was approved by the Institutional review board/Ethical review board **(Ref No-09/15-02-2024)**. The sample size needed to achieve the goal for this cross-sectional study was estimated according to the following formula:

$$n = \frac{Z_{\alpha/2}^{2} \ . \ pq}{d^2}$$

Where.

n is the sample size needed.

Z is the Z statistic for a level of confidence; it is (1.96) for a 95% confidence interval (level of confidence intended to be used for the study).

p is the expected prevalence or estimate on the proportion from previous studies.

q equals 1- p

d is the precision or desired margin of error (type one error), in this study it is set to be *0.05*, i.e., we need the answers to be *0.05* accurate.

Given the lack of a previous study in Iraq to assess the knowledge of medical staff about eye conditions, and to recruit the largest sample size, the knowledge of the health care providers in the study was conservatively assumed to be 50%. The sample size needed was:

$$n = \frac{(1.96)^2 \ . \ 0.50 \ . \ 0.50}{0.05^2} \cong 385$$

The participants were selected through convenient sampling. Family physicians, including consultants, specialists, or resident doctors working at primary health care centers who are available during the data collection period and willing to participate were eligible to be included in our study. General practitioners or other specialists working at the primary health care centers, and family physicians who were not working in primary health care centers were excluded.

The participants were invited to fill a web-based survey questionnaires delivered through a social media

group of family physicians in Iraq. Participants completed a structured, self-administered online questionnaire (Appendix 1) via Google Forms. The tool was adapted from Sathiamohanraj et al,[11] with modifications for local relevance. The questionnaire was kept anonymous and written informed consent was taken from the participants for their data to be used for the research purpose.

The questionnaire included three sections: demographics, knowledge and attitudes toward sight-threatening eye disorders, and perceptions of training adequacy. The knowledge section contained 11 scored questions, with some allowing multiple correct answers. Each correct answer earned one point; total scores were converted into percentages and classified according to Bloom's taxonomy as good (80–100%), moderate (60–80%), or poor (<60%).

The data were entered into Microsoft excel sheets and analyzed using Statistical Package for Social Sciences (SPSS) version 22. Frequency distribution and percentages were calculated for qualitative variables and mean and standard deviation, or the median (25th percentile, 75th percentile) for continuous (quantitative) variables. The Pearson's chi-square test and ANOVA were used to compare categorical variables and to determine significance for the non-parametric variables. P-value of <0.05 was considered statistically significant.

RESULTS

A total of 385 primary health care practitioners responded to the questionnaire The demographic characteristics of the study population are illustrated in Table-1.

The responses of the study participants to the knowledge section of the questionnaire are shown in Table 2 and mean knowledge score and score percentage are depicted in Table 3.

Knowledge was significantly associated with working status ($p < 0.000$), residency year ($p < 0.000$), and length of practice ($p < 0.000$), with consultants and experienced physicians scoring highest. First-year residents (66.0% poor, 0% good) and those with <1 year experience (98.9% poor) performed worst. Gender (p = N.S) and attendance at ophthalmic sessions (p = N.S) showed no significant effect on knowledge scores Table 4.

Univariate and multivariate logistic regression analyses identified current working status as the strongest independent predictor of knowledge scores, with consultants (OR = 3.80) and specialists (OR = 3.50) significantly more likely to achieve "Good" scores compared to residents ($p < 0.001$).Length of practice also had a significant effect, with physicians having 5–10 years of experience showing 3.6 times higher odds of good knowledge compared to those with less than one year ($p < 0.001$).Year of residency was another significant factor, as fourth-year residents had 2.2 times higher odds of scoring "Good" than first-year residents (p = 0.001).In contrast, gender and attendance at ophthalmic sessions were not significant predictors ($p > 0.05$).Overall, current working status had the greatest impact, followed by length of practice and residency year.

Table 1: *Demographic and clinical parameters of the study sample, N=385.*

		No.	%
Gender	Female	284	73.8
	Male	101	26.2
Current Working Status	Family medicine consultants	37	9.6
	Family medicine specialists	135	35.1
	Family medicine residents	213	55.3
Current Year of Residency	First year	94	44.1
	Second year	30	14.1
	Third year	54	25.4
	Fourth year and more	35	16.4
Duration of Practice	<1 year	94	24.4
	1–4 years	192	49.9
	5–10 years	99	25.7
	> 10 years	0	0.0
Attended Ophthalmic Sessions	No	251	65.2
	Yes	134	34.8

Table-2: *The responses of the Physicians to the knowledge related questions regarding sight threatening pediatric conditions, N=385.*

		No.	%
Refer to Ophthalmologist	All newborns	97	25.2
	During regular visits	99	25.7
	I do not know	81	21.0
	No need if there are no symptoms	108	28.1
Causes of Red Painful Eye Disease	Allergy	34	8.8
	Cataract	5	1.3
	Angle closure Glaucoma	43	11.2
	Squint	5	1.3
	Conjunctivitis	64	16.6
	Corneal abrasion	123	31.9
	Acute anterior Uveitis	111	28.8
Causes of Leukocoria	Advanced retinal disorder	64	16.6
	Cataract	124	32.2
	Retinoblastoma	71	18.4
	Toxocariasis	60	15.6
	Glaucoma	66	17.1
Leukocoria	Life-threatening	158	41.0
	Sight-threatening	227	59.0
	Normal variations	0	0.0
Signs of Congenital Glaucoma	Hazy cornea	105	27.3
	Leukocoria	69	17.9
	Large cornea	79	20.5
	Red eye	60	15.6
	Watering	72	18.7
Risk Factors for ROP	Birth weight < 1500 g	53	13.8
	Gestational age ≤ 32 weeks	86	22.3
	Premature baby with comorbidities	170	44.2
	All the above	76	19.7
Management of Painful Red Eye	Depending on the cause	56	14.5
	Refer immediately	84	21.8
	Give eye drop and refer immediately	122	31.7
	Eye drop and refer after 3 days if no improvement	96	24.9
	I do not know	27	7.0
Specify Eye Drops Type	Antibiotics	113	29.4
	Artificial tears	102	26.5
	Antihistamines	121	31.4
	Steroid	49	12.7
Management of Leukocoria	Give eye drops	75	19.5
	Follow up if no improve refer	53	13.8
	Refer immediately	257	66.8
Management of CG	Give eye drops	117	30.4
	Refer immediately	179	46.5
	Follow up if no improve refer	89	23.1
ROP Screening Referral Timing	After NICU discharge	169	43.9
	I do not know	143	37.1
	4-6 weeks after birth	73	19.0
Training Adequacy	Agree	184	47.8
	Disagree	201	52.2

DISCUSSION

This study provides insights into the knowledge, attitudes, and practices of primary healthcare providers regarding pediatric sight-threatening eye disorders. The demographic analysis revealed most female participants (73.8%), reflecting the growing feminization of the healthcare workforce.[12] Most participants were family medicine residents (55.3%), with 44.1% in their first year of training, indicating a concentration of early-career practitioners. Consultants and specialists comprised 9.6% and 35.1% of the sample, respectively. The predominance of residents highlights the need for targeted training during the initial stages of residency to address knowledge gaps and improve the management of pediatric eye disorders. These findings highlight the importance of

Table-3: *Mean knowledge score and the total score percentage for the study participants, N=385.*

		Total Score	Total Score percent (%)
Gender	Female	18	78.3
	Male	17	73.9
Current Working Status	Family medicine consultants	18	78.3
	Family medicine specialists	16	69.6
	Family medicine residents	11	47.8
Current Year of Residency	First year	10	43.5
	Second year	12	52.2
	Third year	13	56.5
	Fourth year and more	14	60.9
Length of Practice	<1 year	9	39.1
	1–4 years	11	47.8
	5–10 years	16	69.6
Attended Ophthalmic Sessions	No	13	56.5
	Yes	16	69.6

Table 4: *Correlation of the parameters of the study participants with their knowledge score level. N=385.*

		Knowledge Score Percentage						Total	P Value
		Poor		Moderate		Good			
		No.	%	No.	%	No.	%		
Gender	Female	112	39.4	96	33.8	76	26.8	284	N.S
	Male	42	41.6	34	33.7	25	24.8	101	
Current Working Status	Family medicine consultant	1	2.7	7	18.9	29	78.4	37	**0.000**
	Family medicine specialist	5	3.7	38	28.1	92	68.1	135	
	Family medicine resident	146	68.5	45	21.1	22	10.3	213	
Current Year of Residency	First year	62	66.0	32	34.0	0	0.0	94	**0.000**
	Second year	18	60.0	16	53.3	0	0.0	30	
	Third year	29	53.7	24	44.4	1	1.9	54	
	Fourth year and more	16	45.7	13	37.1	6	17.1	35	
Length of Practicing	<1 year	93	98.9	1	1.1	0	0.0	94	**0.000**
	1–4 years	102	53.1	55	28.6	35	18.2	192	
	5–10 years	18	18.2	35	35.4	46	46.5	99	
Attended Ophth. Sessions	No	134	53.4	71	28.3	46	18.3	251	N.S
	Yes	72	53.7	33	24.6	29	21.6	134	

Table 5: *Univariate Logistic Regression Analysis of Factors Associated with Knowledge Scores.*

Variable	Odds Ratio (OR)	95% CI	P-value
Gender (Male vs. Female)	1.05	0.85–1.30	0.65
Current Working Status			
Consultant vs. Resident	4.2	2.50–7.10	<0.001
Specialist vs. Resident	3.8	2.30–6.20	<0.001
Year of Residency			
Fourth Year vs. First Year	2.5	1.60–3.90	<0.001
Third Year vs. First Year	1.8	1.20–2.70	0.004
Length of Practicing			
5–10 years vs. <1 year	3.9	2.80–5.40	<0.001
1–4 years vs. <1 year	2.1	1.50–2.90	<0.001
Attended Ophthalmic Sessions (Yes vs. No)	1.1	0.90–1.35	0.35

structured educational interventions to enhance primary health care providers' ability to identify and manage sight-threatening conditions in children effectively.

The mean knowledge score was 13.2 (57.4%), indicating poor overall understanding of pediatric eye disorders, consistent with Hersi et al.[13] Consultants scored highest (78.3%), followed by specialists (69.6%) and residents (47.8%), reflecting the impact of clinical experience, as noted by Ababneh et al and Alrasheed et al.[11,14] There is literature evidence that general practitioners often lack confidence in

managing eye diseases, leading to over-referral.[15]

Knowledge improved with residency level and years of practice, aligning with Bhullar's skill acquisition model.[16] However, early-career physicians scored poorly, and ophthalmic session attendance showed no significant improvement, echoing Forsetlund et al.'s findings on the need for effective continuing education.[17]

A quarter of participants mistakenly believed all newborns should be referred to ophthalmologists, showing gaps in screening knowledge, as reported by Al-Khaled et al.[18] Many practitioners misunderstood the causes of red eye, confusing benign and serious conditions like uveitis and glaucoma, like the findings by Atowa et al.[19]

Recognition of leukocoria was limited: 59.2% identified it as sight-threatening, but only 32.3% and 18.4% correctly identified cataracts and retinoblastoma as causes. Mis-association with glaucoma (17.1%) was higher than reported by Hersi et al[13] and in line with Bonsaana et al.[20] Knowledge gaps persisted in recognizing signs of congenital glaucoma, with hazy cornea most reported (27.3%). Misidentification of leukocoria as a sign of glaucoma was common (17.9%), like findings by Atowa et al and Bonsaana et al.[19,20]

Only 19.7% correctly identified all ROP risk factors, despite its strong association with prematurity and comorbidities, as noted by García et.al and Carroll et al.[21,22] Misconceptions about ROP screening timing were common, with only 19.0% identifying the correct 4–6-week window.[23] Management of urgent conditions revealed training gaps. Only 31.7% correctly chose to treat and refer red eye cases immediately; others opted for delayed referral or were unsure. Likewise, 66.8% correctly identified leukocoria as requiring immediate referral, but many chose incorrect actions, as seen in Atowa et al and Bonsaana et al.[19,20]

For congenital glaucoma, only 46.5% chose immediate referral; 53.5% selected inappropriate management. Similarly, ROP screening knowledge was low, reflecting the need for improved awareness about screening guidelines.[21,22]

Finally, attitudes toward training adequacy were mixed (47.8% agreed, 52.2% disagreed), supporting Alhassan et al and Aftab et al, who highlighted the importance of context-specific, competency-based training.[23,24]

This study has certain limitations. Being a cross-sectional, observational design, it only provides a snapshot of physicians' knowledge and attitudes at a single point in time and cannot establish causality. Data collection relied on a self-administered, web-based survey distributed through social media groups, which may have introduced selection bias, as more motivated or digitally active physicians were more likely to respond. The use of self-reported responses also carries the risk of recall bias and socially desirable answers, possibly overestimating actual knowledge levels. The survey did not include an objective assessment of clinical practice, limiting the ability to link knowledge to real-world patient care. Finally, since the study was conducted only in primary health care centers across Iraq, the findings may not be generalizable to physicians working in other healthcare settings or countries.

CONCLUSION

The study reveals notable knowledge gaps among Primary health care providers, especially residents and less experienced physicians. Experience and professional role were linked to better knowledge, while ophthalmic session attendance had limited impact. Targeted training, mentorship, and curriculum integration of pediatric ophthalmology are recommended to enhance early detection and management of pediatric eye disorders and reduce preventable childhood vision loss.

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Conflict of Interest: Authors declared no conflict of interest.

Ethical Approval: The study was approved by the Institutional review board/Ethical review board **(Ref No-09/15-02-2024)**.

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