

ORIGINAL ARTICLE

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Assessing the knowledge and practices of family physicians in eye screening and early diagnosis

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Abstract

This study aimed to evaluate family physicians' knowledge and practices in primary healthcare settings. It focused specifically on their approaches to eye screening, early diagnosis, and management of eye diseases. This descriptive, cross-sectional study was conducted among family physicians working in the provinces of Erzincan, Trabzon, and Erzurum. Data were collected between September and December 2024 using a 37-item questionnaire developed through a literature review and pilot testing. The questionnaire, delivered via Google Forms, included Likert-scale items covering demographic information, eye screening practices, and knowledge levels. Data were analyzed using descriptive statistics, the Kolmogorov-Smirnov test, Kruskal-Wallis test, Mann Whitney U, and Spearman correlation analysis. A total of 124 family physicians participated in the study. While 40.3% reported performing red reflex screening only for infants aged 0–3 months, 29.8% stated they did not perform it at all. Additionally, 21.8% indicated that a direct ophthalmoscope was either unavailable or its availability was unknown at their centers. The mean knowledge score was 58.15, with male physicians scoring significantly higher than female physicians ($p=0.023$). No significant associations were found between knowledge scores and age, total professional experience, or job title. However, a positive and significant correlation was identified between the duration of family medicine practice and knowledge level ($r=0.240$, $p=0.007$). The findings revealed notable deficiencies in the knowledge and practices of family physicians concerning eye health screening and early diagnosis. To enhance the quality of primary eye care, it is essential to implement regular training programs, ensure the availability of ophthalmic examination tools, and establish national screening protocols. This study contributes foundational insights to strengthen the role of family physicians in the early detection and management of eye conditions.

Keywords: Family practice, vision screening, primary health care, eye diseases

Introduction

Visual impairments and eye diseases are problems that directly affect individuals' quality of life and hold significant importance in public health [1,2]. Early diagnosis and treatment are critically important for preventing the progression of these diseases and reducing vision loss [3]. A large portion of visual impairments can be prevented or treated with early diagnosis and treatment [4]. Especially eye screenings conducted during childhood have positive effects on learning abilities and overall quality of life by enabling the early diagnosis of visual impairments [5,6].

In Turkey, the family medicine system aims to facilitate

individuals' access to primary healthcare services and promote the widespread use of preventive health services. When eye screenings are regularly conducted by family physicians, serious vision loss can be prevented through the early diagnosis of vision disorders and eye diseases [3]. Especially simple screening methods such as the red reflex test and visual acuity measurements allow for the early diagnosis of amblyopia, congenital cataracts, and refractive errors in children [5,7]. Research has shown that such early diagnosis methods can significantly reduce visual impairments and related complications in children [4,8]. Additionally, it has been noted that vision acuity screenings conducted at preschool age are effective in preventing long-term

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visual impairments such as amblyopia [7,9].

Regular eye health screenings by family physicians can reduce the prevalence of preventable blindness in the general population. Family physicians with the right knowledge and practice habits can be more effective in the early diagnosis of eye diseases in childhood and in the management of chronic diseases such as diabetic retinopathy and glaucoma in adults [10,11]. In the current literature in Turkey, it appears that the knowledge and practice levels of family physicians regarding eye health have not been sufficiently researched.

In this study, the knowledge and practice levels of family physicians in the provinces of Erzincan, Trabzon, and Erzurum regarding eye screenings and the diagnosis and management of eye diseases were evaluated. The findings of the study aim to provide important data for the development of strategies to improve eye health services at the primary care level.

Material and Methods

This study was conducted with a descriptive and cross-sectional design. The research was conducted among family physicians working in the provinces of Erzincan, Trabzon, and Erzurum. For participation in the study, it was required that the participants be actively practicing family medicine in the specified provinces, have been in this role for at least six months, and have given their voluntary consent to participate. Participants who filled out incomplete surveys or did not meet the criteria were excluded from the study.

The sample size was calculated based on an estimated 500 family physicians working in the three provinces. Using an 80% confidence interval and 5% margin of error, the minimum required sample size was determined to be 124.

Data Collection Tools

The data for the research were collected through an online survey conducted via Google Forms between September and December 2024. The survey form was prepared by the researchers in accordance with the literature review and tested through a pilot application. The survey, consisting of a total of 37 questions, includes questions aimed at evaluating the participants' demographic information, eye health screening practices, and their knowledge and application levels regarding the diagnosis and treatment of eye diseases.

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The last 20 questions of the survey were prepared to measure the participants' level of knowledge regarding eye health. A five-point Likert scale was used to evaluate the participants' level of knowledge. The response options are as follows: "very good,"

"good," "basic," "limited," and "no knowledge at all."

The answer options are respectively: "very good," "good," "basic," "limited," and "I have no information." In the evaluation, 1 point was given for the option "No, I have no information," and 5 points for the option "Yes, I have very good information," and the total information score was calculated out of 100 accordingly. The survey link was sent to family physicians via email and text message; participants were informed about the purpose of the study and included in the research after obtaining their online consent.

Ethical Approval

The research was conducted with the approval of the Erzincan Binali Yıldırım University Clinical Research Ethics Committee, dated 22.08.2024 and numbered 2024-11/02. Participants were required to approve the informed voluntary consent form online before joining the study, and the study was conducted in accordance with the principles of the Helsinki Declaration.

Data Analysis

The data were analyzed using SPSS 25.0. Normal distribution was evaluated using the Kolmogorov-Smirnov test. Descriptive statistics were used, with the Kruskal-Wallis and Mann Whitney U tests for group comparisons in categorical variables, and the Spearman correlation test for relationships between continuous variables. Statistical significance was accepted as $p < 0.05$.

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Results

A total of 124 family physicians with an average age of 36.52 ± 8.21 (min=25, max=58) participated in the study. 58.9% of the participants (n=73) were male, and 41.1% (n=51) were female. The average duration of medical practice was 11.30 ± 7.84 years (min=1, max=34) and the average duration of family medicine practice was 6.06 ± 4.91 years (min=0.5, max=20). The distribution by province is as follows: Erzincan 29.0% (n=36), Erzurum 21.8% (n=27), and Trabzon 49.2% (n=61). Of the participants, 55.7% (n=69) were general practitioners, 4.0% (n=5) were family medicine specialists, and 40.3% (n=50) were family medicine residents (Table 1).

When examining the equipment and practices related to eye health, 21.8% of family physicians (n=27) reported that they did not have a direct ophthalmoscope in their centers or were unsure of its presence. The percentage of those who perform red reflex screening only on infants aged 0-3 months is 40.3% (n=50), while the percentage of those who never perform it is 29.8% (n=37). 79.9% of the doctors (n=99) stated that they have never detected a negative red reflex. Those who regularly measure visual acuity in children constitute 29.8% (n=37), while those who do so occasionally make up 33.9% (n=42); when strabismus is detected, 68.6% (n=85) of the doctors inform and refer to an ophthalmologist, while 29.0% (n=36) refer directly (Table 1).

Table 1. Demographic characteristics of family physicians and their knowledge and practice status regarding eye health

Category	Response options	n	%
Gender	Woman	51	41.1
	Male	73	58.9
Province of study	Erzincan	36	29
	Erzurum	27	21.8
	Trabzon	61	49.2
Professional title	General practitioner	69	55.7
	Family medicine specialist	5	4
	Family medicine resident	50	40.3
Is there a direct ophthalmoscope available in your center?	Yes	97	78.2
	No	9	7.3
	I'm not sure	18	14.5
Do you know what the red reflex test is?	Yes, I have detailed knowledge	43	34.7
	Yes, I have general knowledge	69	55.6
	No, I do not know the details	12	9.7
Do you perform red reflex screening?	I do it at every examination in babies aged 0-3 months	5	4
	I do it only in doubtful cases	13	10.5
	I do it once in babies 0-3 months	50	40.3
	I rarely do it	19	15.3
	I don't do it at all	37	29.8
How many abnormal red reflexes have you identified so far?	I've never detected it	99	79.9
	I caught it 1-2 times	20	16.1
	I caught it 3-5 times	5	4
Do you assess visual acuity in children?	Yes, on a regular basis	37	29.8
	Yes, occasionally	42	33.9
	No, I don't measure it, but I direct it	28	22.6
	I don't measure and I don't direct	17	13.7
What do you do when you notice strabismus in babies and children	I immediately refer the patient to an ophthalmologist	36	29
	I inform them and refer them to the ophthalmologist	85	68.6
	I follow up and direct you to an ophthalmologist if necessary	2	1.6
	I don't take any action	1	0.8
Should family physicians be trained on vision screenings?	Yes, it should be done, and I would like to participate	112	90.3
	It should be done, but I can't attend	8	6.5
	I don't think it's necessary	4	3.2

The detailed distribution of the responses given by family physicians to each information question is shown in Figure 1; it is observed that the responses mostly reflect a "basic" or "limited" level of knowledge. The average score of family physicians' knowledge level regarding eye health is 58.15±12.13 (min=31, max=98). The knowledge level is 60.42±12.01 in men and 54.90±11.82 in women, and the difference between them is statistically significant (p=0.023). There was no significant difference in knowledge scores between the groups based on job title (p=0.398) and the province worked in (p=0.831). The situation of conducting a red reflex screening (p=0.036) and the

regular measurement of visual acuity in children were found to have a significant relationship with the total score (p<0.001) (Table 2).

When examining the relationships between continuous variables, no statistically significant correlation was found between age (r=0.161; p=0.074) and total years of practice (r=0.159; p=0.078) with the knowledge score. However, a positive and significant correlation was identified between the duration of practicing family medicine and the knowledge score (r=0.240; p=0.007) (Table 3).

Table 2. Comparison of knowledge scores by demographic characteristics and eye screening practices of family physicians

Category	Groups	Mean±S.D.	Min	Max	p
Gender					
	Male	60.42±12.01	34	98	0.023*
	Woman	54.90±11.82	31	92	
Professional title					
	General practitioner family doctor	59.81±12.01	32	98	0.398**
	Family medicine specialist	54.40±14.74	36	70	
	Family medicine assistant	52.24±12.09	31	92	
Province of study					
	Erzincan	57.80±14.42	31	96	0.831**
	Erzurum	59.37±11.43	42	98	
	Trabzon	57.81±11.22	31	92	
Do you perform red reflex screening?					
	I do it at every examination in babies aged 0-3 months	57.80±9.23	47	67	0.036**
	I do it only in doubtful cases	65.15±10.47	46	87	
	I do it once in babies 0-3 months	59.98±12.52	36	98	
	I rarely do it	57.21±6.97	42	70	
	I don't do it at all	53.75±13.48	31	92	
Do you assess visual acuity in children?					
	Yes, on a regular basis	65.21±13.85	43	98	<0.001**
	Yes, occasionally	58.90±9.23	40	78	
	No, I don't measure it, but I direct it	54.75±8.88	32	77	
	I don't measure and I don't direct	46.52±8.91	31	57	

*.Mann–Whitney U test; **.Kruskal–Wallis test

Table 3. Spearman correlation analysis between age, professional experience, and knowledge score among family physicians

Variables		Age	Total duration of medical practice (years)	Duration of practicing family medicine (years)	Total knowledge score (0–100)
Age	r	1.000			
	p	.			
Total duration of medical practice (years)	r	.976	1.000		
	p	.000	.		
Duration of practicing family medicine (years)	r	.846	.850	1.000	
	p	.000	.000	.	
Total knowledge score (0–100)	r	.161	.159	.240	1.000
	p	.074	.078	.007	.

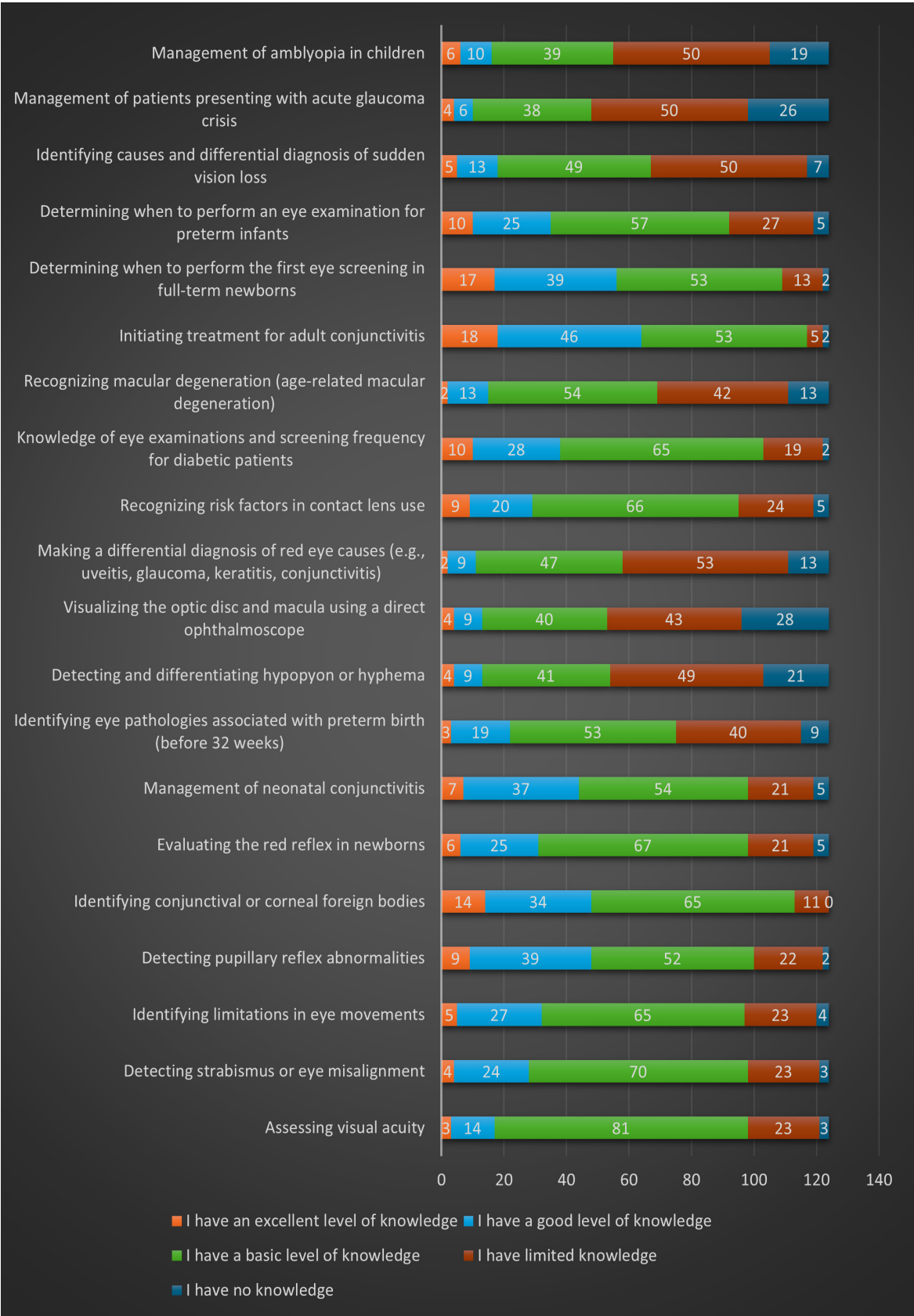


Figure 1. Responses of family physicians to knowledge assessment questions

Discussion

In this study, when evaluating the knowledge and practice levels of family physicians working in the provinces of Erzincan, Trabzon, and Erzurum regarding eye health, it was observed that they possessed basic knowledge but had deficiencies in some practices. It has been determined that screening methods, especially the red reflex test and visual acuity measurements, which play a critical role in early diagnosis, are not performed regularly enough.

40.3% of the participants stated that they only applied the red reflex test to infants aged 0-3 months, while 29.8% indicated that they never applied it. Moreover, the fact that 79.9% of the doctors had never captured a negative red reflex suggests that the red reflex test is not effectively used in the routine practices of family physicians. However, this test is a critical tool for early detection of significant eye diseases that emerge during childhood, such as congenital cataract and amblyopia [5,12,13].

On the other hand, 21.8% of participants reported lacking a direct ophthalmoscope or being unsure of its availability in their centers. This is notable because regulations mandate the presence of this device in primary care facilities. This deficiency in the use or access to the direct ophthalmoscope, which is one of the most important tools for conducting basic ophthalmological evaluations in primary healthcare services, reduces the chance of early diagnosis and makes standardization difficult [3,14,15]. Despite the requirements outlined in the regulations, the lack of the device or its limited use indicates a gap between theory and practice.

Preschool visual acuity measurements are not commonly performed. About one-third of participants (33.9%) perform them occasionally, and 29.8% do so regularly. This reflects shortcomings in early childhood vision screening. In terms of the development of visual functions in children, screenings during this period are of great importance for the early detection of amblyopia and refractive errors [16,17]. Failure to conduct regular measurements increases the risk of developing severe visual impairments in the future [18,19].

When the data regarding the knowledge level of family physicians was examined, the participants mostly evaluated themselves as having "basic or limited knowledge." The results of this study, showing that male physicians had significantly higher knowledge scores than female physicians, suggest that educational and practice habits may differ by gender. In contrast, the significant relationship between the average knowledge score and the duration of practicing family medicine, but not with the total duration of practicing medicine, suggests that the unique nature of the family medicine system and practical experience may be effective in increasing the level of knowledge. On the other hand, the lack of a significant difference in knowledge levels based on factors such as job title or workplace in this study suggests that the need for education is widespread across all groups. Similarly, the literature indicates that the knowledge levels of primary care physicians regarding

eye health screenings are generally low, but this level increases with experience [1]. However, it is emphasized that educational deficiencies are widespread not only among a specific group but among all physicians, and that eye health screenings need to be better integrated [3]. These findings indicate that education on eye health should be planned in a more inclusive manner. The fact that the vast majority of participants (90.3%) requested training on eye health screenings indicates that family physicians are open to and eager to improve themselves in this area. This situation should be taken into account in the training planning to be conducted by health authorities.

Limitations

This study has several limitations. Due to the cross-sectional design and the selection of participants from only a specific geography, cause-and-effect relationships could not be evaluated, and the findings were interpreted at the relational level. Since participation in the study was based on voluntary involvement, the participants may not fully represent the entire population. Additionally, the collection of data through online surveys may increase the risk of incomplete or incorrect responses and could exclude participants who have issues accessing technology. The limitation of the study to the provinces of Erzincan, Trabzon, and Erzurum restricts the generalizability of the results. However, despite these limitations, the study provides significant data on the knowledge and practice levels of family physicians regarding eye health screenings.

Conclusion

In conclusion, this study reveals significant deficiencies in the knowledge and practice levels regarding eye health among family physicians working in primary healthcare services. The widespread implementation and standardization of eye health screenings are critical for reducing preventable vision loss and improving the overall quality of life in the community. In this context, it is necessary to provide regular and up-to-date training programs for family physicians, to make ophthalmological examination equipment accessible in every family health center, and to develop national-level protocols for conducting vision screenings in preschool children. Additionally, monitoring screening practices and establishing feedback mechanisms will enhance the effectiveness of the implementations. Primary care services enhanced with training, equipment, and awareness campaigns can preserve community eye health. These measures would strengthen early diagnosis and treatment efforts. This study provides a foundation to strengthen the role of family physicians in eye health services and to address the existing gaps in this area.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

The study was approved by the Erzincan Binali Yıldırım University Clinical Research Ethics Committee, dated 22.08.2024 and numbered 2024-11/02.

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