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ORIGINAL ARTICLE

Unmet need for eye care and associated barriers among adults in Jeddah, Saudi Arabia: a cross-sectional study

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ABSTRACT

Background: Ocular symptoms and eye conditions are common among adults in Saudi Arabia, yet many affected individuals do not receive professional eye assessment or management. The factors associated with this gap in care remain unclear. We estimated the prevalence of unmet eye-care need among adults in Jeddah and identified associated factors.

Methods: A cross-sectional study was conducted among adults aged 18 years or older residing in Jeddah between August and November 2025, using a self-administered Arabic-language questionnaire and convenience sampling. Eye care need was classified from ten ocular symptom items as fully met, partially met, fully unmet, or asymptomatic. The primary outcome was unmet need (fully or partially unmet), with analysis restricted to participants with a need for eye care. Associations were examined by bivariate testing and multivariable logistic regression. Reporting followed the Strengthening the Reporting of Observational Studies in Epidemiology.

Results: Among 442 participants (median age 24.0 years, interquartile range 21.0–40.0; 58.6% male), 291 were identified as having an eye-care need. Of these, 181 (62.2%) had a partially or fully unmet need. The most frequently reported barriers were a busy schedule (47.1%), perceiving the eye problem as non-serious (47.1%), and perceiving vision changes as normal aging (40.0%). After adjustment, unmet need was independently associated with a family history of eye disease (aOR 1.99, 95% CI 1.17–3.41, $p = 0.012$) and a preference for home or traditional treatments (aOR 2.47, 95% CI 1.22–4.97, $p = 0.012$), and inversely associated with a previously diagnosed eye disorder (aOR 0.36, 95% CI 0.19–0.66, $p = 0.001$) and having been informed about the importance of regular eye examinations (aOR 0.50, 95% CI 0.29–0.86, $p = 0.013$). Neither cost ($p = 0.762$) nor health insurance ($p = 0.498$), nor any sociodemographic characteristic, differed between groups.

Conclusion: Unmet need for eye care affected 62.2% of adults with an identified need. The associated factors were clinical, attitudinal, and informational rather than financial or sociodemographic, suggesting that strategies to improve utilization may need to address health beliefs and the perceived value of routine eye examination alongside measures aimed at convenience and affordability.

Keywords: Eye care, health services utilization, unmet need, barriers, cross-sectional studies, Saudi Arabia.

Introduction

Visual impairment and blindness remain a major global health burden. An estimated 2.2 billion people live with vision impairment, and in at least 1 billion cases, the impairment could have been prevented or remains unaddressed, including through correction of refractive error and cataract surgery [1]. Other important causes of vision impairment include diabetic retinopathy, glaucoma, and age-related macular degeneration, for

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which timely detection and appropriate management can help prevent or limit vision loss [1].

Saudi Arabia has experienced substantial growth in its ophthalmology workforce and training capacity [2]. However, ocular symptoms and conditions do not always result in professional eye assessment or management. A national survey reported a dry eye disease prevalence of 49.5%, with a proportion of affected individuals identified through severe symptoms rather than a previous formal diagnosis [3]. Similarly, 73.9% of participants in Southern Saudi Arabia reported ocular symptoms, while only 26.7% of the overall sample had consulted an ophthalmologist [4]. In Riyadh, refractive errors were highly prevalent, yet most participants with myopia or astigmatism did not wear spectacles [5]. Together, these findings highlight a gap between the presence of ocular symptoms or conditions and the receipt of appropriate eye care.

Barriers to eye care may be person- or service-related. A scoping review identified lack of perceived need as a common person-related barrier, while cost, waiting times, and appointment availability were among the reported service-related barriers [6]. Person-related barriers were more prevalent overall than service-related barriers [6]. However, frequently reported barriers may not necessarily be the factors independently associated with unmet need.

We therefore examined eye-care utilization among adults in Jeddah, focusing on the gap between the presence of ocular symptoms and receipt of appropriate eye care. Unmet need was defined as having current ocular symptoms for which care was partially or fully unmet. The study aimed to describe diagnosed ocular conditions and reported barriers, estimate the prevalence of unmet eye-care need among adults with an identified need, and identify factors associated with unmet need.

Methods

Study design and setting

This cross-sectional study was conducted among adults residing in Jeddah, Saudi Arabia, between 2 August and 25 November 2025. Data were collected using a self-administered electronic questionnaire (Google Forms) distributed in public locations, including malls and mosques, and through online platforms using convenience sampling. Reporting followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement.

Participants and sample size

Adults aged ≥18 years who resided in Jeddah and provided electronic informed consent were eligible. The minimum sample size was 385, based on an anticipated 50% prevalence of underutilization of eye care services, a 95% confidence level, and a 5% margin of error. Of the 577 respondents, those aged <18 years or not residing in Jeddah were excluded, leaving 442 participants for analysis.

Study instrument and outcome definition

The structured Arabic-language questionnaire was developed from relevant literature and covered sociodemographic characteristics, medical and ocular history, eye care awareness, perceived barriers, and 10 ocular symptoms: reduced distance vision, reduced near vision, flashes or floaters, double vision, night vision weakness, eye pain, redness, itching, excessive tearing, and periocular swelling. The questionnaire's content validity was assessed by three consultant ophthalmologists, and the instrument was piloted in 30 participants. Test-retest reliability of barrier items was assessed over 7 days using Cohen's kappa; items with kappa >0.4 were retained.

For each symptom, participants reported whether it was diagnosed and treated or corrected, diagnosed but untreated, present without an eye doctor visit, or absent. Eye care need was classified using a study-specific rule: fully met when all symptomatic items were diagnosed and treated or corrected; partially met when there was a mixture of treated and untreated; fully unmet when symptomatic items were reported without any eye care contact; and asymptomatic when none of the 10 symptoms were reported. The primary outcome, "unmet need," combined partially met and fully unmet need and excluded asymptomatic participants. An alternative definition including the full sample was examined in sensitivity analysis. Marital status, education, and occupation were collapsed into analytic categories, and age was categorized as 18-24, 25-39, and ≥40 years.

Statistical analysis

Categorical variables were summarized as frequencies and percentages, and age as median and interquartile range (IQR) because of its non-normal distribution (Shapiro–Wilk test). Associations with unmet need were assessed using chi-square tests without continuity correction, Fisher's exact test when expected cell counts were <5, and the Mann–Whitney U test for age. Univariable logistic regression was performed for each characteristic. Variables with p <0.05 in bivariate analysis were entered into multivariable logistic regression, with adjusted odds ratios (aORs) and Wald 95% confidence intervals (CIs) reported. Multicollinearity was assessed using variance inflation factors.

Two sensitivity analyses were performed: a multivariable model using a broader p <0.20 entry criterion and repetition of the analysis using the alternative full-sample outcome definition. Missing data were handled by complete-case analysis. Analyses were performed in R v4.4 (R Foundation for Statistical Computing, Vienna, Austria). Statistical significance was set at two-tailed p <0.05.

Interpretation of estimates

Because exposures and outcomes were measured simultaneously, estimates represent associations rather than causal effects, and temporality cannot be established. Residual confounding remains possible, and analyses beyond the primary outcome definition were exploratory.

Table 1. *Characteristics of the study participants (N = 442)*

Characteristic	Value (N = 442)
Age, years, median (IQR)	24.0 (21.0–40.0)
Age group, n (%)	
18-24 years	229 (51.8)
25-39 years	93 (21.0)
≥ 40 years	120 (27.1)
Male gender, n (%)	259 (58.6)
Saudi nationality, n (%)	408 (92.3)
Marital status, n (%)	
Single	267 (60.4)
Married	159 (36.0)
Divorced or widowed	16 (3.6)
Educational level, n (%)	
High school or below	92 (20.8)
University	314 (71.0)
Higher education	36 (8.1)
Occupation, n (%)	
Employed	186 (42.1)
Student	194 (43.9)
Unemployed	44 (10.0)
Retired	18 (4.1)
Monthly family income, n (%)	
< 5,000 SAR	70 (15.8)
5,000-9,999 SAR	58 (13.1)
10,000-14,999 SAR	74 (16.7)
≥ 15,000 SAR	124 (28.1)
Prefer not to answer	116 (26.2)
Chronic disease, n (%)	70 (15.8)
Diabetes mellitus, n (%)	28 (6.3)
Family history of eye disease, n (%)	227 (51.4)
Health insurance, n (%)	166 (37.6)
Previously diagnosed eye disorder, n (%)	218 (49.3)
Impact of eye problems on daily activities, n (%)	
No	210 (47.5)
Yes	75 (17.0)
No current symptoms	157 (35.5)
Informed about importance of regular eye examinations, n (%)	201 (45.5)
Aware of appropriate timing of eye care visits, n (%)	109 (24.7)
Aware of ophthalmology subspecialties, n (%)	208 (47.1)
Reported barriers to eye care, n (%)	
High cost of examination or treatment	155 (35.1)
Distance or transport barrier	79 (17.9)
Busy schedule or lack of time	208 (47.1)
Difficulty booking an appointment	121 (27.4)
Lack of a companion or helper	31 (7.0)
Fear of medical procedures or diagnosis	79 (17.9)
Other health issues limiting visits	23 (5.2)
Preference for home or traditional treatments	108 (24.4)
Perceiving the eye problem as non-serious	208 (47.1)
Perceiving vision changes as normal aging	177 (40.0)
Eye care need classification, n (%)	
Fully met	110 (24.9)
Partially met	104 (23.5)
Fully unmet	77 (17.4)
Asymptomatic	151 (34.2)

QR, interquartile range; SAR, Saudi riyal. Data are n (%) unless otherwise stated. For binary variables, only the "yes" category is shown; the complement to 100% represents "no" responses. Impact on daily activities was recorded as no, yes, or no current symptoms, as per the questionnaire.

Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of King Abdulaziz University Hospital (Reference No. 242-25; May 26, 2025; National Committee of Bioethics registration No. HA-02-J-008).

Electronic informed consent was obtained before enrolment; participation was voluntary, withdrawal was permitted, and responses were anonymous.

Results

Participant characteristics

A total of 442 adults participated, with a median age of 24.0 years (IQR 21.0-40.0); 259 (58.6%) were male, and 408 (92.3%) were Saudi nationals. Most participants held a university degree (314, 71.0%), 227 (51.4%) reported a family history of eye disease, and 218 (49.3%) had a previously diagnosed eye disorder. The most frequently reported barriers to eye care were a busy schedule (208, 47.1%), perceiving the eye problem as non-serious (208, 47.1%), and perceiving vision changes as normal aging (177, 40.0%). Full characteristics are presented in Table 1.

Diagnosed ocular conditions and care status by symptom

Refractive errors were the most frequently reported diagnosed ocular condition (183 participants, 41.4%), followed by dry eye disease (103, 23.3%) and eye allergy (72, 16.3%); cataract (11, 2.5%), glaucoma (10, 2.3%), diabetic retinopathy (7, 1.6%), and age-related macular degeneration (6, 1.4%) were each reported by fewer than 3% of participants (Fig. 1a). Reduced distance vision was the most frequently reported symptom (197, 44.6%), followed by reduced near vision (102, 23.1%) and eye itching (95, 21.5%). The number of participants who were symptomatic without having visited an eye care professional was highest for eye itching (48, 10.9%), reduced distance vision (41, 9.3%), and eye redness (37, 8.4%) (Fig. 1b).

Need classification and bivariate analysis

Of the 442 participants, 110 (24.9%) were classified as having fully met need, 104 (23.5%) partially met need, 77 (17.4%) fully unmet need, and 151 (34.2%) were asymptomatic. Among the 291 participants with a need for eye care, 181 (62.2%) had an unmet need. Participants with unmet need more frequently reported a family history of eye disease (116/181, 64.1% *vs.* 50/110, 45.5%, $p = 0.002$), fear of medical procedures or diagnosis (48/181, 26.5% *vs.* 12/110, 10.9%, $p = 0.001$), and a preference for home or traditional treatments (58/181, 32.0% *vs.* 14/110, 12.7%, $p = 0.0002$), and less frequently reported a previously diagnosed eye disorder (110/181, 60.8% *vs.* 89/110, 80.9%, $p = 0.0003$) or having been informed about the importance of regular eye examinations (81/181, 44.8% *vs.* 68/110, 61.8%, $p = 0.005$). Awareness of ophthalmology subspecialties ($p = 0.048$), a busy schedule ($p = 0.039$), perceiving the eye problem as non-serious ($p = 0.044$), and perceiving vision changes as normal aging ($p = 0.005$) were also

significantly associated with unmet need, giving nine characteristics in total that met the $p < 0.05$ criterion. No sociodemographic characteristic differed significantly between the two groups (Table 2).

Univariable and multivariable logistic regression

In the multivariable model, unmet need remained associated with a family history of eye disease (aOR = 1.99, 95% CI 1.17-3.41, $p = 0.012$) and a preference for home or traditional treatments (aOR = 2.47, 95% CI 1.22-4.97, $p = 0.012$), whereas a previously diagnosed eye disorder (aOR = 0.36, 95% CI 0.19-0.66, $p = 0.001$) and having been informed about the importance of regular eye examinations (aOR = 0.50, 95% CI 0.29-0.86, $p = 0.013$) were associated with lower odds of unmet need. Fear of medical procedures or diagnosis did not reach statistical significance after adjustment (aOR = 2.09, 95% CI 0.98-4.46, $p = 0.056$). These four associations were consistent in the sensitivity model with a $p < 0.20$ entry criterion, family history, a busy schedule, and a preference for home or traditional treatments remained associated with unmet need under the alternative full-sample outcome definition (Tables 3, 4 and 5).

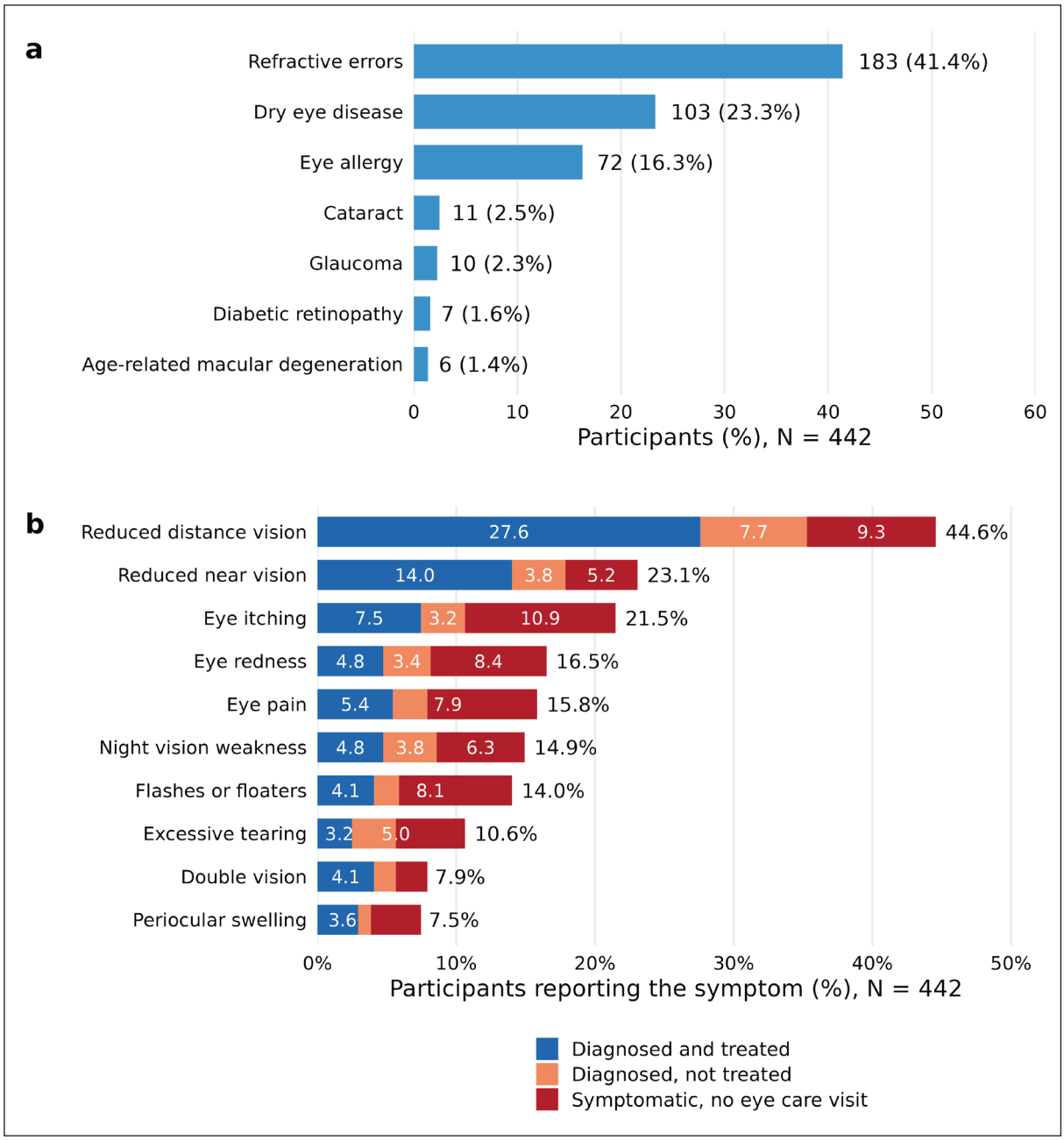


Figure 1. *Diagnosed ocular conditions and care status across the ten ocular symptoms (N = 442). a Self-reported physician-diagnosed ocular conditions, shown as n (%) of all participants; participants could report more than one condition. b Care status for each of the ten ocular symptoms, restricted to participants reporting that symptom; bar segments are mutually exclusive, and the value at the end of each bar is the total proportion reporting the symptom. The complement to 100% represents participants with no current symptom. Symptoms are ordered by the total proportion reporting them.*

Table 2. *Comparison of participants with met and unmet need for eye care (n = 291).*

Characteristic	Met need (*n* = 110)	Unmet need (*n* = 181)	*p* value[a]
Age, years, median (IQR)	25.0 (22.0–45.0)	24.0 (21.0–43.0)	0.243
Age group, n (%)			0.838
18-24 years	54 (49.1)	94 (51.9)	
25-39 years	19 (17.3)	27 (14.9)	
≥ 40 years	37 (33.6)	60 (33.1)	
Male gender, n (%)	58 (52.7)	97 (53.6)	0.886
Saudi nationality, n (%)	100 (90.9)	170 (93.9)	0.335
Marital status, n (%)			0.551
Single	64 (58.2)	106 (58.6)	
Married	43 (39.1)	65 (35.9)	
Divorced or widowed	3 (2.7)	10 (5.5)	
Educational level, n (%)			0.332
High school or below	28 (25.5)	33 (18.2)	
University	75 (68.2)	134 (74.0)	
Higher education	7 (6.4)	14 (7.7)	
Occupation, n (%)			0.931
Employed	46 (41.8)	74 (40.9)	
Student	45 (40.9)	80 (44.2)	
Unemployed	13 (11.8)	18 (9.9)	
Retired	6 (5.5)	9 (5.0)	
Monthly family income, n (%)			0.999
< 5,000 SAR	18 (16.4)	29 (16.0)	
5,000-9,999 SAR	16 (14.5)	25 (13.8)	
10,000-14,999 SAR	19 (17.3)	31 (17.1)	
≥ 15,000 SAR	30 (27.3)	52 (28.7)	
Prefer not to answer	27 (24.5)	44 (24.3)	
Chronic disease, n (%)	16 (14.5)	37 (20.4)	0.206
Diabetes mellitus, n (%)	6 (5.5)	18 (9.9)	0.177
Family history of eye disease, n (%)	50 (45.5)	116 (64.1)	**0.002**
Health insurance, n (%)	42 (38.2)	62 (34.3)	0.498
Previously diagnosed eye disorder, n (%)	89 (80.9)	110 (60.8)	**0.0003**
Impact on daily activities, n (%)			0.549
No	69 (62.7)	109 (60.2)	
Yes	24 (21.8)	49 (27.1)	
No current symptoms	17 (15.5)	23 (12.7)	
Informed about importance of regular eye examinations, n (%)	68 (61.8)	81 (44.8)	**0.005**
Aware of appropriate timing of eye care visits, n (%)	33 (30.0)	39 (21.5)	0.105
Aware of ophthalmology subspecialties, n (%)	63 (57.3)	82 (45.3)	**0.048**
Reported barriers to eye care, n (%)			
High cost of examination or treatment	43 (39.1)	74 (40.9)	0.762
Distance or transport barrier	19 (17.3)	45 (24.9)	0.130
Busy schedule or lack of time	57 (51.8)	116 (64.1)	**0.039**
Difficulty booking an appointment	33 (30.0)	66 (36.5)	0.259
Lack of a companion or helper	6 (5.5)	17 (9.4)	0.227
Fear of medical procedures or diagnosis	12 (10.9)	48 (26.5)	**0.001**
Other health issues limiting visits	4 (3.6)	11 (6.1)	0.361
Preference for home or traditional treatments	14 (12.7)	58 (32.0)	**0.0002**
Perceiving the eye problem as non-serious	48 (43.6)	101 (55.8)	**0.044**
Perceiving vision changes as normal aging	36 (32.7)	90 (49.7)	**0.005**

[a] Chi-square test without continuity correction; Fisher's exact test where any expected cell count was below five; Mann-Whitney U test for age. IQR, interquartile range; SAR, Saudi riyal. Percentages are column-wise. For binary variables, only the "yes" category is shown; the complement to 100% represents "no" responses. Bold indicates statistical significance at $p < 0.05$.

Points are aORs and horizontal bars are 95% CIs from a single multivariable logistic regression model that included all nine variables associated with unmet need at $p < 0.05$ in bivariate analysis. All variables are binary (yes *vs.* no reference). The dashed vertical line marks the null value (aOR = 1); estimates in red are statistically significant ($p < 0.05$). The x-axis is on a logarithmic scale.

Preference for home or traditional treatments and a family history of eye disease were associated with higher odds of unmet need, whereas a previously diagnosed eye disorder and being informed about the importance of regular eye examinations were associated with lower odds; the remaining five factors were not significant after adjustment (Figure 2).

Sensitivity analyses

Under the alternative full-sample definition, 14 characteristics were associated with unmet need at $p < 0.05$, including age group, a family history of eye disease, a previously diagnosed eye disorder, the impact of eye problems on daily activities, and several barriers to eye care (Table 4).

The four significant associations from the primary model were retained in Model A, which used a broader $p < 0.20$ entry criterion; diabetes mellitus was additionally associated with unmet need in this model (aOR = 2.95, 95% CI 1.01-8.60, $p = 0.048$). Under the full-sample definition (Model B), a family history of eye disease (aOR = 1.99, 95% CI 1.25-3.15, $p = 0.004$), a busy schedule (aOR =

Table 3. *Univariable and multivariable logistic regression of factors associated with unmet need for eye care (n = 291).*

Variable	OR (95% CI)	*p* value	aOR (95% CI)	*p* value
Family history of eye disease	2.14 (1.32-3.47)	**0.002**	1.99 (1.17-3.41)	**0.012**
Previously diagnosed eye disorder	0.37 (0.21-0.64)	**0.0004**	0.36 (0.19-0.66)	**0.001**
Informed about importance of regular eye examinations	0.50 (0.31-0.81)	**0.005**	0.50 (0.29-0.86)	**0.013**
Aware of ophthalmology subspecialties	0.62 (0.38-1.00)	**0.048**	0.92 (0.53-1.59)	0.759
Busy schedule or lack of time	1.66 (1.02-2.69)	**0.039**	1.57 (0.92-2.68)	0.100
Fear of medical procedures or diagnosis	2.95 (1.49-5.84)	**0.002**	2.09 (0.98-4.46)	0.056
Preference for home or traditional treatments	3.23 (1.70-6.14)	**0.0003**	2.47 (1.22-4.97)	**0.012**
Perceiving the eye problem as non-serious	1.63 (1.01-2.63)	**0.045**	1.04 (0.59-1.83)	0.890
Perceiving vision changes as normal aging	2.03 (1.24-3.33)	**0.005**	1.16 (0.64-2.10)	0.626

OR, unadjusted odds ratio; aOR, adjusted odds ratio; CI, confidence interval. The multivariable model included all variables listed (bivariate $p < 0.05$); all variables are binary (yes vs no reference). All variance inflation factors were below 1.3. Bold indicates statistical significance at $p < 0.05$.

1.93, 95% CI 1.20-3.12, $p = 0.007$), and a preference for home or traditional treatments (aOR = 1.93, 95% CI 1.12-3.33, $p = 0.019$) were associated with higher odds of unmet need, whereas reporting no current symptoms on the daily-activities item was associated with lower odds (aOR = 0.15, 95% CI 0.08-0.28, $p = 7.6 \times 10^{-10}$); age group was not significant after adjustment (Table 5).

Discussion

In this cross-sectional survey of adults in Jeddah, unmet eye-care need was common, and attitudinal and logistical barriers were frequently reported. Refractive error was the most commonly reported diagnosed ocular condition in our study (41.4%). Previous Saudi studies using objective refractive measurements reported a refractive-error prevalence of 45.8% among adults in Arar [7], while a Riyadh study reported astigmatism and myopia prevalences of 66.3% and 48.7%, respectively [5]. Diagnosed dry eye disease in our study (23.3%) was lower than the 32.1% prevalence of dry-eye symptoms reported in Al-Ahsa [8] and the 49.5% dry-eye disease prevalence reported in a national questionnaire-based study [3]. Similarly, diagnosed eye allergy was reported by 16.3% of participants in our study. In the Southern region, 9.1% of participants reported being diagnosed with allergic conjunctivitis, although 73.9% reported ocular symptoms [4], while a questionnaire-based study in western Saudi Arabia reported an age- and sex-adjusted allergic conjunctivitis prevalence of 70.5% [9]. These differences may partly reflect variation in outcome definition and measurement: our estimates were based on self-reported previous diagnoses, whereas the comparison studies used objective refractive measurements, symptom-based definitions, or questionnaire-based case definitions

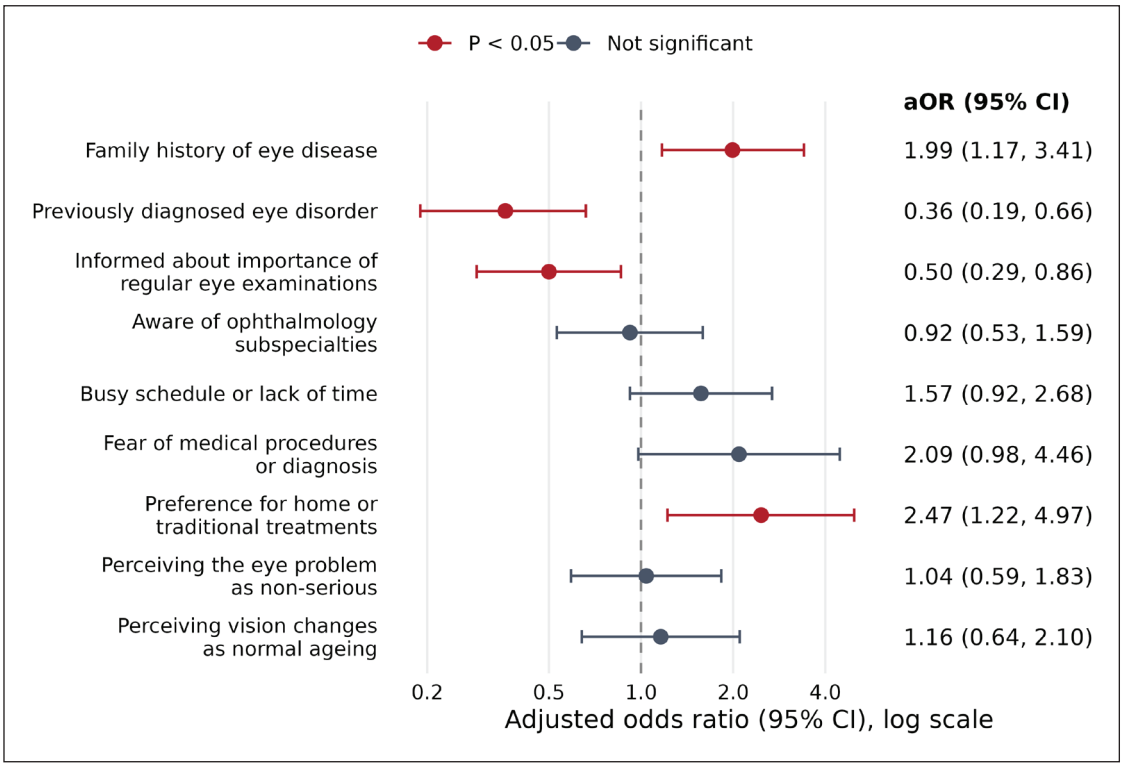


Figure 2. *Multivariable logistic regression of factors associated with unmet need for eye care (n = 291).*

Table 4. *Bivariate associations with unmet need for eye care under the alternative full-sample outcome definition (N = 442).*

Characteristic	Met need or no need (*n* = 261)	Unmet need (*n* = 181)	*p value*[a]
Age, years, median (IQR)	24.0 (21.0-38.0)	24.0 (21.0-43.0)	0.706
Age group, n (%)			**0.009**
18-24 years	135 (51.7)	94 (51.9)	
25-39 years	66 (25.3)	27 (14.9)	
≥ 40 years	60 (23.0)	60 (33.1)	
Male gender, n (%)	162 (62.1)	97 (53.6)	0.075
Saudi nationality, n (%)	238 (91.2)	170 (93.9)	0.289
Marital status, n (%)			0.197
Single	161 (61.7)	106 (58.6)	
Married	94 (36.0)	65 (35.9)	
Divorced or widowed	6 (2.3)	10 (5.5)	
Educational level, n (%)			0.489
High school or below	59 (22.6)	33 (18.2)	
University	180 (69.0)	134 (74.0)	
Higher education	22 (8.4)	14 (7.7)	
Occupation, n (%)			0.868
Employed	112 (42.9)	74 (40.9)	
Student	114 (43.7)	80 (44.2)	
Unemployed	26 (10.0)	18 (9.9)	
Retired	9 (3.4)	9 (5.0)	
Monthly family income, n (%)			0.959
< 5,000 SAR	41 (15.7)	29 (16.0)	
5,000-9,999 SAR	33 (12.6)	25 (13.8)	
10,000-14,999 SAR	43 (16.5)	31 (17.1)	
≥ 15,000 SAR	72 (27.6)	52 (28.7)	
Prefer not to answer	72 (27.6)	44 (24.3)	
Chronic disease, n (%)	33 (12.6)	37 (20.4)	**0.027**
Diabetes mellitus, n (%)	10 (3.8)	18 (9.9)	**0.009**
Family history of eye disease, n (%)	111 (42.5)	116 (64.1)	**8.2×10^{-6}**
Health insurance, n (%)	104 (39.8)	62 (34.3)	0.233
Previously diagnosed eye disorder, n (%)	108 (41.4)	110 (60.8)	**0.00006**
Impact on daily activities, n (%)			**9.6×10^{-17}**
No	101 (38.7)	109 (60.2)	
Yes	26 (10.0)	49 (27.1)	
No current symptoms	134 (51.3)	23 (12.7)	
Informed about importance of regular eye examinations, n (%)	120 (46.0)	81 (44.8)	0.799
Aware of appropriate timing of eye care visits, n (%)	70 (26.8)	39 (21.5)	0.206
Aware of ophthalmology subspecialties, n (%)	126 (48.3)	82 (45.3)	0.538
Reported barriers to eye care, n (%)			
High cost of examination or treatment	81 (31.0)	74 (40.9)	**0.033**
Distance or transport barrier	34 (13.0)	45 (24.9)	**0.001**
Busy schedule or lack of time	92 (35.2)	116 (64.1)	**2.3×10^{-9}**
Difficulty booking an appointment	55 (21.1)	66 (36.5)	**0.0004**
Lack of a companion or helper	14 (5.4)	17 (9.4)	0.103
Fear of medical procedures or diagnosis	31 (11.9)	48 (26.5)	**0.00008**
Other health issues limiting visits	12 (4.6)	11 (6.1)	0.491
Preference for home or traditional treatments	50 (19.2)	58 (32.0)	**0.002**
Perceiving the eye problem as non-serious	107 (41.0)	101 (55.8)	**0.002**
Perceiving vision changes as normal aging	87 (33.3)	90 (49.7)	**0.0005**

[a] Chi-square test without continuity correction; Fisher's exact test where any expected cell count was below five; Mann-Whitney U test for age. Unmet need is defined here as a fully or partially unmet classification versus met need or no need (asymptomatic). IQR, interquartile range; SAR, Saudi riyal. Percentages are column-wise. For binary variables, only the "yes" category is shown; the complement to 100% represents "no" responses. Bold indicates statistical significance at $p < 0.05$.

Table 5. *Sensitivity multivariable logistic regression models of factors associated with unmet need for eye care.*

Variable	Model A aOR (95% CI)	*p* value	Model B aOR (95% CI)	*p* value
Age group: 25-39 years	–	–	0.71 (0.38-1.33)	0.289
Age group: ≥ 40 years	–	–	1.06 (0.62-1.81)	0.844
Chronic disease	–	–	1.14 (0.59-2.19)	0.695
Diabetes mellitus	2.95 (1.01–8.60)	**0.048**	2.49 (0.98-6.32)	0.055
Family history of eye disease	1.98 (1.15–3.42)	**0.014**	1.99 (1.25-3.15)	**0.004**
Previously diagnosed eye disorder	0.34 (0.18–0.63)	**0.0007**	0.88 (0.53-1.47)	0.636
Impact on daily activities: yes	–	–	1.66 (0.88-3.14)	0.116
Impact on daily activities: no current symptoms	–	–	0.15 (0.08-0.28)	**7.6×10^{-10}**
Informed about importance of regular eye examinations	0.46 (0.25-0.83)	**0.010**	–	–
Aware of appropriate timing of eye care visits	0.96 (0.48-1.93)	0.909	–	–
Aware of ophthalmology subspecialties	0.93 (0.52-1.66)	0.812	–	–
High cost of examination or treatment	–	–	0.80 (0.48-1.35)	0.404
Distance or transport barrier	1.10 (0.56-2.17)	0.787	1.24 (0.66-2.33)	0.506
Busy schedule or lack of time	1.64 (0.94-2.86)	0.081	1.93 (1.20-3.12)	**0.007**
Difficulty booking an appointment	–	–	1.26 (0.74-2.15)	0.398
Fear of medical procedures or diagnosis	1.97 (0.91-4.22)	0.084	1.72 (0.92-3.20)	0.088
Preference for home or traditional treatments	2.48 (1.22-5.04)	**0.012**	1.93 (1.12-3.33)	**0.019**
Perceiving the eye problem as non-serious	1.05 (0.60-1.85)	0.869	1.26 (0.77-2.06)	0.352
Perceiving vision changes as normal aging	1.14 (0.62-2.07)	0.676	1.42 (0.86-2.35)	0.167

Model A: primary outcome definition (participants with a need for eye care, $n = 291$) with a broader entry criterion of bivariate $p < 0.20$. Model B: alternative full-sample outcome definition ($N = 442$) with entry at bivariate $p < 0.05$; age was entered as age group, matching its form in Table 4. aOR, adjusted odds ratio; CI, confidence interval. –, variable not entered in that model. All variables are binary (yes *vs.* no reference) except age group (reference: 18-24 years) and impact on daily activities (reference: no). Bold indicates statistical significance at $p < 0.05$.

that could identify ocular conditions or symptoms irrespective of a previous formal diagnosis.

Among participants classified as having an eye-care need, 62.2% had a partially or fully unmet need. Previous Saudi studies have also documented gaps in eye-care utilization. In Riyadh, most participants with measured refractive errors did not wear spectacles [5]. Similarly, in the Southern region, 73.9% of participants reported ocular symptoms, while only 26.7% of the overall sample had consulted an ophthalmologist [4]. Gaps have also been reported among people with diabetes: approximately 35% of participants in a Jeddah study did not attend eye check-ups [10], while 35.1% of patients with type 2 diabetes attending primary care in Riyadh reported never having had a vision examination [11]. Although these studies assessed different conditions and aspects of eye-care utilization, this overall pattern suggests a persistent gap in the use of eye-care services in Saudi Arabia and highlights the importance of identifying factors associated with unmet eye-care need.

Several perceived barriers to eye care were frequently reported. Lack of time and perceiving the eye problem as non-serious were each reported by 47.1% of participants, while 40.0% perceived vision changes as part of normal aging. This pattern is consistent with a scoping review of urban populations, which found person-related barriers to be more prevalent than service-related barriers and identified lack of perceived need as a common barrier to eye-care utilization [6]. However, despite their frequency in our study, lack of time, perceiving the eye problem as non-serious, and attributing vision changes to normal aging were not independently associated with unmet need after adjustment. Their high frequency therefore reflects commonly perceived obstacles to eye care but should not be interpreted as evidence that they independently explain unmet need.

Preference for home or traditional treatments was associated with higher odds of unmet need (aOR 2.47, 95% CI 1.22-4.97), consistent with previous evidence identifying cultural or traditional beliefs as barriers to the uptake of eye-care services [12]. In contrast, being informed about the importance of regular eye examinations (aOR 0.50, 95% CI 0.29-0.86) and having a previous eye diagnosis (aOR 0.36, 95% CI 0.19-0.66) were associated with lower odds of unmet need. This is consistent with previous evidence showing greater eye-care utilization among individuals aware of the importance of regular eye examinations and those with a history of eye disease [13].

Strengths of this study include an adequate sample size, a content-validated questionnaire, test-retest reliability assessment, prespecified sensitivity analyses, and reporting in accordance with STROBE. Limitations include the use of self-reported diagnoses and barriers, which may introduce recall and misclassification bias, while the questionnaire did not assess the severity of reported barriers. Health-system factors were not assessed, and convenience sampling resulted in a relatively young, highly educated sample. The cross-sectional design precludes causal inference, residual confounding remains possible, and the study-specific definition of unmet need has not been externally validated. Multiple comparisons should also be interpreted cautiously.

Conclusion

Unmet need for eye care was common in this convenience sample of adults in Jeddah, affecting 62.2% of participants with an identified eye-care need. Time constraints and attitudinal factors were frequently reported as barriers. In adjusted analyses, unmet need was associated with a preference for home or traditional treatments and a family

history of eye disease, whereas a previous eye diagnosis and being informed about the importance of regular eye examinations were associated with lower odds of unmet need. Cost, health insurance, and sociodemographic characteristics were not significantly associated with unmet need in the primary analysis. Given the cross-sectional design and convenience sampling, these findings should be interpreted as associations within the study sample rather than evidence of causal effects or population-representative estimates. Population-representative and longitudinal studies are needed to confirm these findings and clarify the direction of the observed associations.

List of Abbreviations

aOR	Adjusted odds ratio
CI	Confidence interval
IQR	Interquartile range
OR	Odds ratio
SAR	Saudi riyal
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology

Declarations

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent to participate

Electronic informed consent was obtained from all participants before enrolment.

Availability of data and materials

The de-identified dataset generated and analyzed during the current study is available from the corresponding author on reasonable request.

Ethical approval

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Supplementary content (If any) is available online.

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