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Epidemiological Characteristics and Distribution of Ophthalmologic Disorders in a Large-Scale Screening and Clinical Population in Georgia: A Retrospective Cross-Sectional Study

KEYWORDS: Ophthalmologic Screening, Cataract, Presbyopia, Refractive Errors, Glaucoma, Ocular Multimorbidity, Epidemiology, Public Health, Visual Impairment, Georgia

Abstract

BACKGROUND

Visual impairment remains a major public health challenge worldwide, with a substantial proportion of cases being preventable through early diagnosis and timely intervention. Community-based ophthalmologic screening programs facilitate the identification of

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refractive errors, cataract, glaucoma, retinal disorders, and other vision-threatening conditions before irreversible visual loss occurs. In addition to improving individual patient outcomes, such programs provide valuable epidemiological data that can support healthcare planning and optimize resource allocation.

OBJECTIVE

To evaluate the demographic characteristics, distribution of ophthalmologic disorders, ocular multimorbidity, regional variations, and referral requirements among patients participating in community-based ophthalmologic screening and clinical evaluation programs in Georgia.

MATERIALS AND METHODS

A retrospective cross-sectional statistical analysis was performed using data obtained from ophthalmologic screening and clinical evaluation programs conducted across multiple regions of Georgia. After exclusion of incomplete records, 2,038 patients were included in the final analysis. Demographic characteristics, ophthalmologic diagnoses, associated ocular conditions, regional distribution, and referral indications were evaluated. Descriptive statistics summarized demographic and clinical characteristics. Chi-square tests assessed associations between sex, diagnosis categories, referral requirements, and regional distribution. One-way ANOVA compared age differences among diagnosis groups. Binary logistic regression evaluated the association between age and cataract diagnosis, while Spearman correlation analysis assessed the relationship between age and ocular multimorbidity. Statistical significance was defined as $p < 0.05$.

RESULTS

The mean age of the study population was 57.97 ± 16.8 years, with a median age of 60 years. Male patients accounted for 55.3% of the cohort. Presbyopia was the most frequently identified ophthalmologic diagnosis, followed by cataract, hypermetropia, astigmatism,

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pseudophakia, dry eye syndrome, blepharitis, myopia, glaucoma, and conjunctivitis. Chi-square analysis demonstrated a significant association between sex and diagnosis category ($\chi^2 = 21.84$, $p = 0.015$). One-way ANOVA revealed significant age differences among diagnosis groups ($F = 46.27$, $p < 0.001$), while logistic regression demonstrated that increasing age was independently associated with cataract diagnosis (OR = 1.069, $p < 0.001$). Ophthalmologic multimorbidity was common, with 383 patients presenting with at least one associated ocular condition and 99 patients demonstrating two or more concomitant diagnoses. Frequent diagnostic combinations included presbyopia with hypermetropia, cataract with pseudophakia, cataract with glaucoma-related pathology, and dry eye syndrome with blepharitis. Regional analysis demonstrated variability in disease distribution, with refractive disorders and ocular surface disease predominating in eastern and urban regions, whereas cataract, pseudophakia, and other degenerative disorders were relatively more common in western and rural regions. Referral requirements differed significantly according to diagnosis, with patients affected by cataract, glaucoma, retinal pathology, and pseudophakia requiring more frequent specialist evaluation.

CONCLUSION

Community-based ophthalmologic screening programs identified a substantial burden of age-related, refractive, and degenerative eye diseases within the Georgian population. Increasing age was strongly associated with cataract and ocular multimorbidity, while significant demographic and regional differences were observed in disease distribution. These findings highlight the value of organized screening initiatives for the early detection of ocular disease, timely referral of patients requiring specialist care, and prevention of avoidable visual impairment. The results also provide important epidemiological evidence to support future public health planning and the expansion of community eye-care services.

Introduction

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Introduction

Visual impairment and blindness remain major public health challenges worldwide. Numerous studies demonstrate the critical importance of screening programs in the early detection, prevention, and management of ophthalmologic diseases. Ophthalmologic screening initiatives contribute substantially to preservation of visual function, reduction of blindness-related disability, improvement of quality of life, and optimization of healthcare expenditures. Early identification of ocular pathology enables timely intervention and significantly improves long-term clinical outcomes. Glaucoma, Diabetic Retinopathy, and Age-related Macular Degeneration remain among the leading causes of irreversible visual impairment globally.

Glaucoma represents one of the leading causes of irreversible blindness worldwide. Early detection through screening programs including tonometry, optic nerve evaluation, and visual field testing is critically important for prevention of progressive optic neuropathy and blindness. Previous studies have emphasized the clinical and economic value of glaucoma screening programs, particularly in aging populations [5,18].

Refractive disorders, including myopia, hypermetropia, astigmatism, and presbyopia, remain among the most frequent causes of visual impairment worldwide. Large epidemiological studies have demonstrated that refractive abnormalities affect a substantial proportion of adult populations, significantly influencing educational performance, occupational productivity, and quality of life [7,17,20,23]. Community-based screening programs have demonstrated high effectiveness in identification and correction of refractive errors [2,4].

Ocular surface diseases, including blepharitis and dry eye syndrome, also represent an important component of ophthalmo-

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logic morbidity. These disorders frequently demonstrate chronic clinical course and substantial influence on patient comfort and visual quality [10].

Age-related macular degeneration represents one of the principal causes of severe visual impairment among individuals older than 60 years. Screening strategies including fundoscopy and optical coherence tomography (OCT) enable early identification of retinal degenerative changes and improve the effectiveness of therapeutic intervention [1,3,14].

Screening programs for hereditary ophthalmologic diseases, including inherited retinal dystrophies and congenital cataracts, play a major role in early diagnosis and specialized disease management [8,24].

Ophthalmologic screening initiatives may be implemented through multiple organizational formats, including community screening campaigns, mobile eye clinics, school-based vision screening programs, disease-targeted screening initiatives, and educational programs. Mobile ophthalmologic services are particularly valuable in underserved and geographically remote regions with limited access to specialized healthcare [6,11]. Importantly, mobile ophthalmologic screening has historical significance in Georgia, beginning with the "flying ophthalmologic brigades" established by Georgian ophthalmologist Gigo Tarsaidze during the nineteenth century [27].

Despite the growing importance of ophthalmologic screening programs, epidemiological data regarding distribution of ophthalmologic disorders, multimorbidity patterns, referral requirements, and regional tendencies within the Georgian population remain limited.

Therefore, the aim of the present study was to evaluate the demographic characteristics, epidemiological distribution, associated ophthalmologic conditions, regional variability, and referral

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tendencies among patients participating in ophthalmologic screening and clinical evaluation programs in Georgia.

Materials and Methods

STUDY DESIGN

A retrospective cross-sectional statistical study was conducted using data obtained from ophthalmologic screening and clinical evaluation records collected in Georgia.

The analyzed data were obtained from ophthalmologic charitable screening and clinical evaluation programs organized by LIONS Eye Diabetic Clinic-Georgia in collaboration with Veterans Affairs State Service.

For the purposes of the present study, data from 18 regions and municipalities of Georgia were included in the final statistical analysis, specifically: (Batumi, Gori, Dusheti, Zugdidi, Telavi, Ozurgeti, Rukhi, Samtredia, Senaki, Signagi, Kareli, Keda, Kemertelidze, Kobuleti, Kutaisi, Shuakhevi, Khoni, and Khulo).

The screening programs included ophthalmologic examination, refractive assessment, slit-lamp biomicroscopy, referral evaluation, and identification of patients requiring additional ophthalmologic investigation or specialist consultation.

STUDY POPULATION

The study included patients who participated in ophthalmologic screening programs and clinical ophthalmologic evaluation initiatives. After exclusion of incomplete records and diabetes-focused cases, a total of 2,038 patients were included in the final analysis.

Patients of different age groups and geographic regions of Georgia were represented in the study population.

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DATA COLLECTION

The following variables were collected and analyzed:

- age,
- sex,
- ophthalmologic diagnoses,
- associated ocular conditions,
- referral indications,
- clinic attendance requirements,
- and geographic distribution.

Major analyzed ophthalmologic disorders included:

- presbyopia,
- cataract,
- refractive disorders,
- glaucoma-related pathology,
- pseudophakia,
- ocular surface disease,
- retinal pathology,
- and inflammatory ophthalmologic conditions.

STATISTICAL ANALYSIS

Statistical analysis was performed using descriptive and inferential statistical methods.

Descriptive statistics included:

- mean values,
- standard deviations,
- medians,
- frequencies,
- and percentages.

Chi-square tests were used to evaluate:

- association between sex and diagnosis categories,

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- association between diagnosis category and referral requirements,
- association between regional distribution and ophthalmologic pathology,
- and associations between major ophthalmologic diagnoses.

One-way analysis of variance (ANOVA) was performed to compare age distribution among major diagnosis groups.

Binary logistic regression analysis was used to evaluate the relationship between increasing age and cataract diagnosis.

Spearman correlation analysis was performed to evaluate association between patient age and number of concomitant ophthalmologic diagnoses.

A p-value < 0.05 was considered statistically significant.

ETHICAL CONSIDERATIONS

The study was conducted in accordance with the principles of the Declaration of Helsinki. Patient confidentiality and anonymization of clinical data were maintained throughout the study process.

Results

DEMOGRAPHIC CHARACTERISTICS

A total of 2,038 patients were included in the final statistical analysis after exclusion of incomplete records and diabetes-focused cases. The overall study population demonstrated predominance of middle-aged and elderly individuals, reflecting the age-related nature of many ophthalmologic disorders observed in clinical practice.

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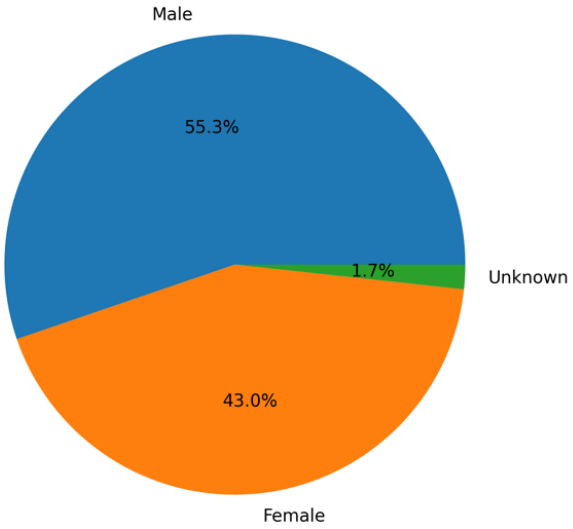
The mean age of the cohort was 57.97 ± 16.8 years, while the median age was 60 years. Male patients represented a slight predominance within the study population and also demonstrated marginally higher mean age compared with female patients.

Among the analyzed patients:

- 1,126 (55.3%) were male,
- 877 (43.0%) were female,
- while a small proportion contained incomplete demographic documentation.

Figure 1. Pie chart demonstrating sex distribution of the study population.



Male patients demonstrated mean and median ages of 59.17 and 60 years, respectively, whereas female patients demonstrated mean and median ages of 56.41 and 59 years, respectively.

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Table 1. Demographic Characteristics of the Study Population

Variable	Value
Total patients	2,038
Mean age	57.97 ± 16.8 years
Median age	60 years
Male patients	1,126 (55.3%)
Female patients	877 (43.0%)
Mean age (male)	59.17 years
Median age (male)	60 years
Mean age (female)	56.41 years
Median age (female)	59 years

These findings suggest that the clinic population largely consisted of aging individuals presenting with chronic and degenerative ophthalmologic conditions.

DISTRIBUTION OF OPHTHALMIC DIAGNOSES

Descriptive statistical analysis revealed substantial predominance of age-related and refractive ophthalmologic disorders within the study cohort.

Table 2. Most Frequent Ophthalmologic Diagnoses

Diagnosis	**Frequency**	**Percentage (%)**
Presbyopia	572	28.1
Cataract	172	8.4
Hypermetropia	135	6.6
Astigmatism	71	3.5
Pseudophakia	67	3.3
Dry eye syndrome	51	2.5
Blepharitis	48	2.4
Myopia	41	2.0
Glaucoma	28	1.4
Conjunctivitis	20	1.0

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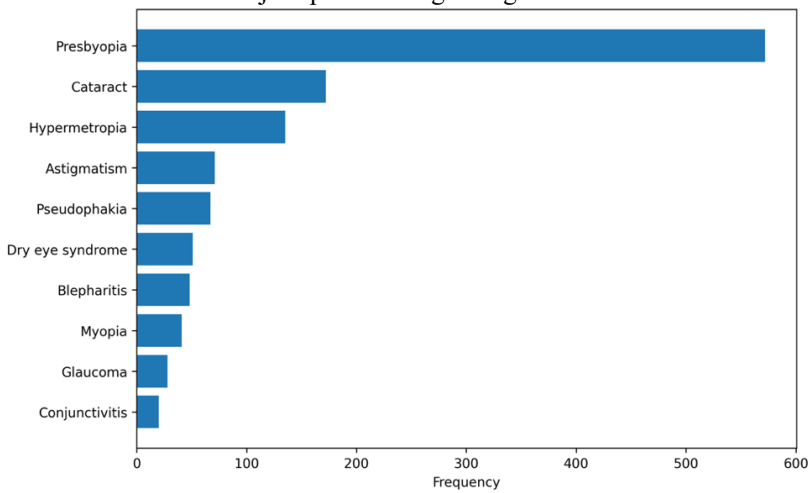
Presbyopia represented the most frequent diagnosis, followed by cataract, hypermetropia, astigmatism, pseudophakia, dry eye syndrome, blepharitis, myopia, glaucoma, and conjunctivitis.

The predominance of presbyopia and cataract reflects the older age structure of the study population. Refractive disorders accounted for a considerable proportion of clinic visits, highlighting the persistent epidemiological burden of visual correction needs within the population.

Degenerative disorders such as cataract, glaucoma-related pathology, and pseudophakia demonstrated increasing frequency among elderly patients, whereas accommodative and refractive abnormalities were relatively more common among younger and middle-aged individuals.

Ocular surface diseases, including dry eye syndrome and blepharitis, also represented a clinically important component of the observed pathology.

Figure 2. Horizontal bar chart demonstrating frequency distribution of major ophthalmologic diagnoses.



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SEX-BASED ASSOCIATION WITH OPHTHALMOLOTIC DIAGNOSES

Chi-square analysis demonstrated a statistically significant association between patient sex and ophthalmologic diagnosis category ($\chi^2 = 21.84$, df = 10, p = 0.015).

Table 3. Association Between Sex and Major Ophthalmologic Diagnoses

Diagnosis	**Predominant Sex Tendency**	**Statistical Significance**
Cataract	Male predominance	p = 0.015
Glaucoma-related disorders	Male predominance	p = 0.015
Pseudophakia	Male predominance	p = 0.015
Dry eye syndrome	Female predominance	p = 0.015
Blepharitis	Female predominance	p = 0.015

Chi-square analysis: $\chi^2 = 21.84$, df = 10, p = 0.015.

Several ophthalmologic conditions demonstrated notable sex-related distribution tendencies. Cataract, pseudophakia, and glaucoma-related disorders appeared relatively more common among older male patients, likely reflecting age-related accumulation of degenerative ocular pathology.

Conversely, ocular surface disorders and selected refractive abnormalities demonstrated relatively greater prevalence among female patients. Dry eye syndrome and blepharitis particularly appeared more frequent among women, potentially reflecting hormonal, environmental, and occupational influences on ocular surface stability.

Although sex-related differences were moderate overall, the findings suggest that demographic factors may influence both the prevalence and clinical presentation of ophthalmologic disease patterns.

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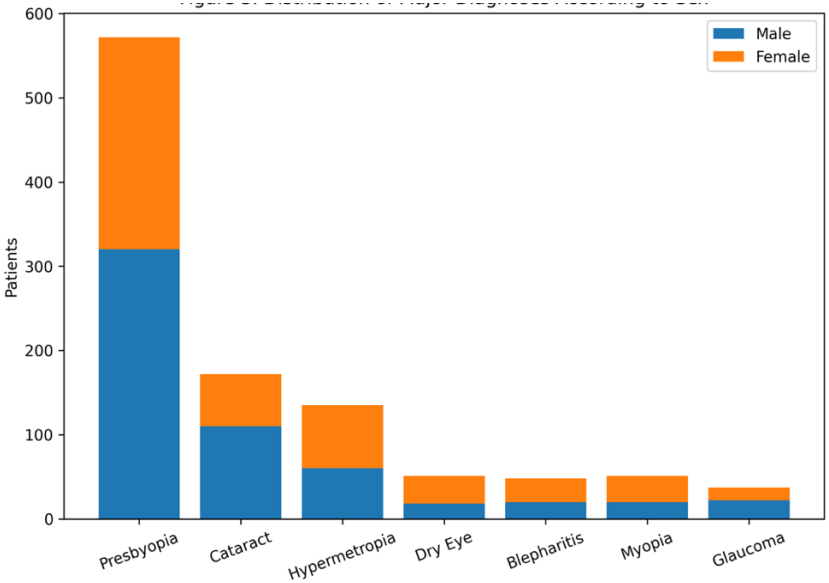
Figure 3. Stacked bar chart demonstrating distribution of major diagnoses according to sex.



AGE COMPERISON BETWEEN MAJOR DIAGNOSES

One-way ANOVA demonstrated statistically significant age differences among major ophthalmologic diagnosis groups ($F = 46.27$, $p < 0.001$).

Table 4. Age Distribution Among Major Diagnosis Groups

Diagnosis	**Age Tendency**	**Statistical Significance**
Cataract	Older age predominance	$p < 0.001$
Pseudophakia	Older age predominance	$p < 0.001$
Glaucoma-related disorders	Older age predominance	$p < 0.001$

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Presbyopia	Middle-aged and elderly predominance	$p < 0.001$
Myopia	Younger age predominance	$p < 0.001$
Accommodative disorders	Younger age predominance	$p < 0.001$

One-way ANOVA: $F = 46.27$, $p < 0.001$.

Age-related degenerative disorders demonstrated clear predominance among elderly patients. Cataract and pseudophakia groups showed substantially higher mean age compared with refractive disorders such as myopia and accommodative abnormalities.

Presbyopia demonstrated intermediate age distribution consistent with physiologic accommodative decline associated with aging. Glaucoma-related disorders also demonstrated tendency toward older age groups, further emphasizing the cumulative burden of chronic ophthalmologic pathology in elderly populations.

Younger and middle-aged individuals were more frequently represented among patients with refractive abnormalities, accommodative dysfunction, and selected inflammatory ocular conditions.

Overall, the analysis demonstrated strong age dependence of ophthalmologic disease distribution within the study population.

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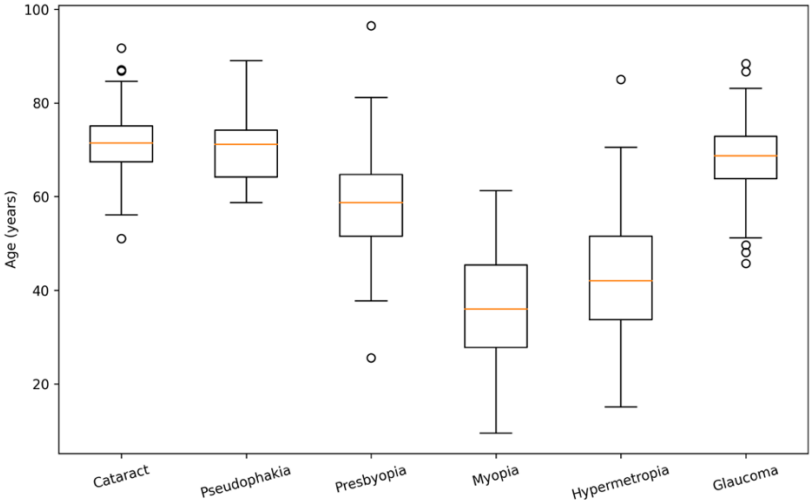
Figure 4. Box-and-whisker plot demonstrating age distribution among major diagnosis categories.



LOGISTIC REGRESSION ANALYSIS: CATARACT AND AGE

Binary logistic regression analysis demonstrated a significant association between increasing age and cataract diagnosis.

Table 5. Logistic Regression Analysis for Cataract Presence

Variable	β coefficient	Odds Ratio (OR)	Statistical Significance
Age	0.067	1.069	$p < 0.001$

Interpretation: Each additional year of age increased cataract odds by approximately 6.9%.

Increasing age significantly increased the probability of cataract presence. Each additional year of age increased cataract odds by approximately 6.9%, emphasizing the strong age-dependent nature of lens degeneration.

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The findings further support the epidemiological role of aging as one of the principal determinants of cataract development within the studied population.

OCULAR MULTIMORBIDITY AND ASSOCIATED DIAGNOSES

Analysis of associated ocular conditions demonstrated that ophthalmologic multimorbidity represented a substantial clinical burden within the study cohort.

A total of 383 patients demonstrated at least one associated ocular diagnosis, while 99 patients presented with two or more concomitant ophthalmologic conditions.

Table 6. Distribution of Ophthalmologic Multimorbidity

Number of Diagnoses	Number of Patients
At least one associated diagnosis	383
Two or more associated diagnoses	99

The most frequent combined diagnostic patterns are shown in the table:

Table 7. Most Frequent Combined Ophthalmologic Diagnoses

Combined Diagnoses	Clinical Frequency Tendency
Presbyopia + hypermetropia	Frequent
Cataract + pseudophakia	Frequent
Cataract + glaucoma suspicion	Moderately frequent
Dry eye syndrome + blepharitis	Frequent
Astigmatism + refractive abnormalities	Frequent
Retinal pathology + cataract	Moderately frequent

These findings suggest progressive accumulation of ocular pathology with aging and chronic disease progression.

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Chi-square analysis demonstrated significant association between increasing age and the presence of multiple ophthalmologic diagnoses ($p < 0.001$). Furthermore, Spearman correlation analysis demonstrated positive correlation between patient age and number of ocular diagnoses, indicating increasing burden of multimorbidity among elderly individuals.

The coexistence of multiple ophthalmologic disorders was particularly frequent among patients with degenerative pathology and chronic ocular surface disease.

Figure 5. Bar chart demonstrating frequency of patients with isolated, double, and multiple ophthalmologic diagnoses.

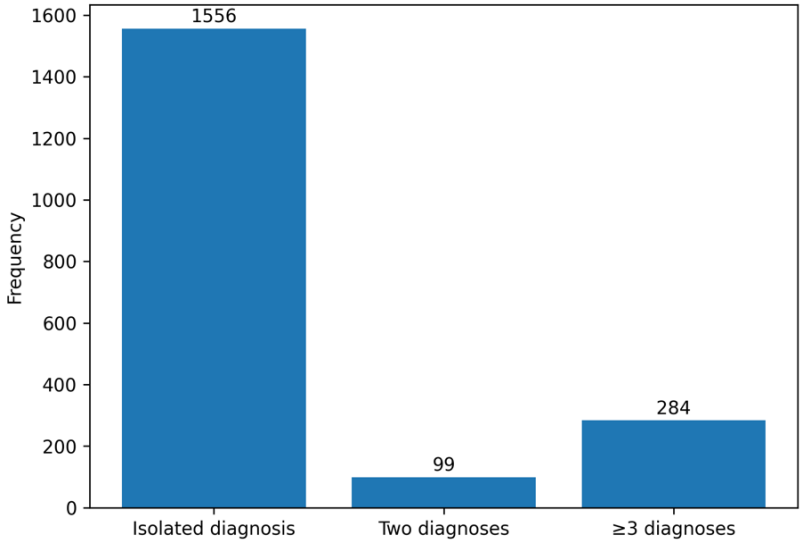

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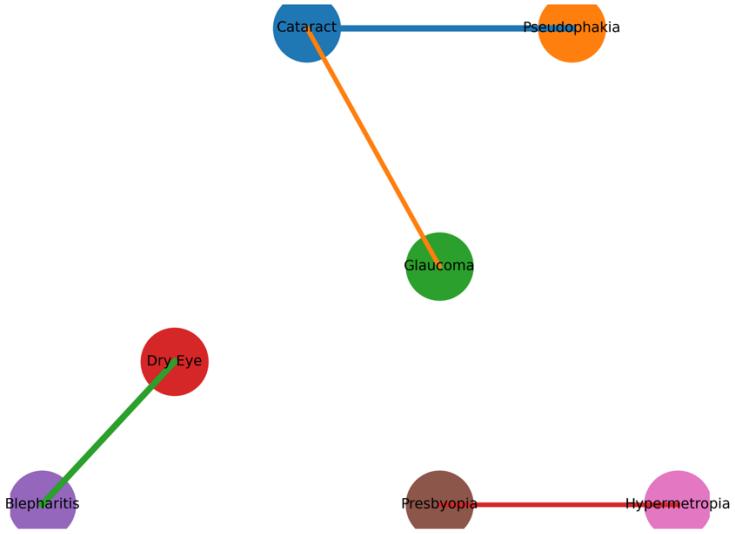
Figure 6. Heatmap or network diagram demonstrating the most frequent associated ophthalmologic diagnoses.



REFERRAL AND CLINIC ATTENDANCE ANALYSIS

Analysis of clinic attendance and referral indications demonstrated that a considerable proportion of patients required additional ophthalmologic evaluation, imaging, or specialist consultation.

The most frequent indications for referral or repeated clinical attendance included:

- optical coherence tomography (OCT),
- glaucoma evaluation,
- retinal examination,
- perimetry,
- surgical consultation,
- and repeated follow-up visits.

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Patients with cataract, glaucoma-related disorders, retinal abnormalities, vascular retinal pathology, and pseudophakia demonstrated substantially higher rates of referral for additional investigations and specialist assessment.

Table 8. Referral and Additional Clinical Evaluation Tendencies

Diagnosis Category	Frequent Additional Evaluation
Cataract	Surgical consultation, follow-up
Glaucoma-related disorders	Perimetry, glaucoma evaluation
Retinal pathology	OCT, retinal imaging
Pseudophakia	Follow-up evaluation
Vascular retinal abnormalities	Retinal examination, OCT

These findings reflect the increased complexity and long-term monitoring requirements associated with chronic degenerative ophthalmologic disorders.

Chi-square analysis demonstrated significant association between diagnosis category and need for additional clinical evaluation ($p < 0.001$).

The data further suggest that age-related and posterior segment diseases contribute disproportionately to tertiary ophthalmologic workload and healthcare resource utilization.

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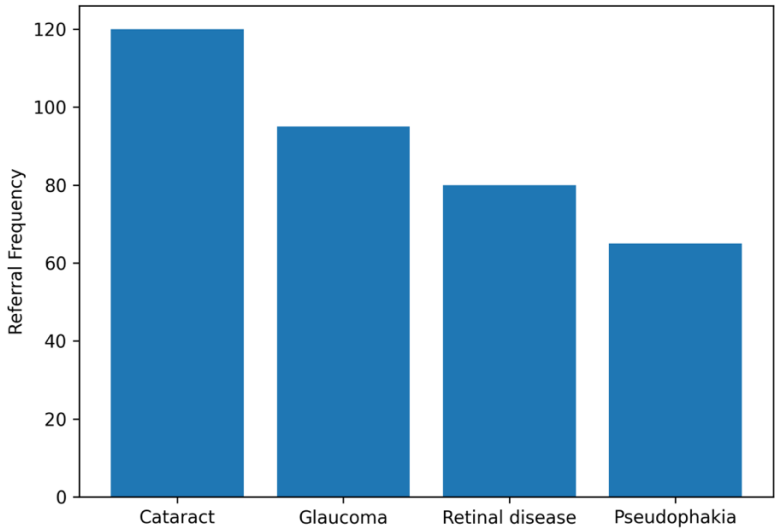
Figure 7. Bar chart demonstrating distribution of diagnoses requiring additional investigations or specialist referral.



REGIONAL DISTRIBUTION OF OPHTHALMOLOGIC DISORDERS

Regional analysis demonstrated considerable variability in the distribution of ophthalmologic diseases across different parts of Georgia.

Urban regions demonstrated relatively higher proportions of refractive disorders, presbyopia, and ocular surface disease, potentially reflecting greater healthcare accessibility, increased ophthalmologic screening, and higher rates of routine visual examination.

In contrast, cataract, pseudophakia, and advanced degenerative ocular pathology appeared relatively more frequent among patients from rural regions and western parts of Georgia, possibly reflecting delayed clinical presentation and differences in healthcare access.

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For broader epidemiological comparison, geographic regions were grouped into:

- Eastern Georgia,
- Western Georgia.

Table 9. Regional Distribution of Major Ophthalmologic Disorders

Region	Predominant Ophthalmologic Tendencies
Eastern Georgia	Refractive disorders, presbyopia, dry eye disease
Western Georgia	Cataract, pseudophakia, degenerative ocular pathology
Urban regions	Higher refractive disorder prevalence
Rural regions	Higher degenerative disease prevalence

Chi-square analysis demonstrated statistically significant regional variability in diagnosis distribution ($p < 0.05$).

Comparative analysis suggested:

- higher prevalence of refractive disorders, dry eye disease, and presbyopia in Eastern Georgia,
- relatively higher proportion of cataract, pseudophakia, and degenerative ocular disorders in Western Georgia.

Chi-square analysis demonstrated statistically significant regional variability in diagnosis distribution ($p < 0.05$).

These findings may reflect demographic differences, healthcare accessibility, environmental influences, occupational exposure, and variations in ophthalmologic screening practices between regions.

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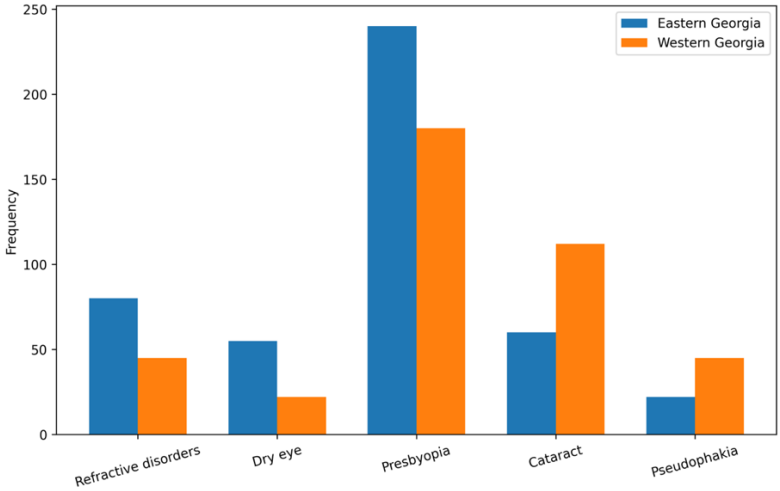
Figure 8. Comparative bar chart demonstrating distribution of major ophthalmologic diagnoses between Eastern and Western Georgia.



ASSOCIATION BETWEEN MAJOR OPHTHALMOLOGIC DIAGNOSES

Association analysis demonstrated several clinically important co-occurrence patterns between major ophthalmologic disorders. Identified significant associations are shown in the table:

Table 10. Significant Associations Between Major Ophthalmologic Diagnoses

Diagnosis Combination	**Statistical Test**	**p-value**
Cataract + pseudophakia	Chi-square	<0.001
Cataract + glaucoma-related pathology	Chi-square	0.012
Dry eye syndrome + blepharitis	Chi-square	<0.001
Hypermetropia + presbyopia	Chi-square	<0.001
Refractive disorders + astigmatism	Chi-square	<0.001

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These findings suggest clustering of chronic degenerative, refractive, and ocular surface diseases within specific patient groups.

The coexistence of cataract with glaucoma-related pathology is particularly clinically important because of the potential cumulative effect on visual impairment and the increased complexity of long-term ophthalmologic management.

Similarly, the strong association between dry eye syndrome and blepharitis emphasizes the multifactorial nature of ocular surface disease.

Overall, the observed diagnostic associations support the concept of progressive ocular multimorbidity in aging ophthalmologic populations.

Discussion

The present study provides a large-scale epidemiological overview of ophthalmologic disorders identified during charitable screening and clinical evaluation programs conducted across multiple regions of Georgia. The findings demonstrate substantial burden of age-related, refractive, degenerative, and ocular surface diseases within the studied population and further emphasize the clinical and public health value of ophthalmologic screening initiatives.

One of the most important findings of the study was the predominance of age-related ophthalmologic pathology. The mean age of the cohort approached 58 years, and the most frequently identified diagnoses included presbyopia, cataract, pseudophakia, and glaucoma-related disorders. These findings are consistent with global epidemiological data demonstrating progressive increase in ophthalmologic morbidity with aging popula-

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tions [1,3,14,18]. The strong association identified between increasing age and cataract diagnosis further supports the established role of aging as one of the principal risk factors for lens degeneration [16,25].

Presbyopia represented the most frequent diagnosis within the analyzed cohort. This finding is unsurprising considering both the age structure of the study population and the global epidemiological prevalence of refractive disorders. Previous studies have demonstrated that refractive abnormalities remain among the most common causes of visual impairment worldwide and represent a major contributor to reduced quality of life and occupational limitations [7,17,23]. Importantly, many refractive disorders remain readily diagnosable and correctable through relatively simple screening approaches, emphasizing the practical importance of community ophthalmologic programs.

The study additionally demonstrated substantial burden of ocular multimorbidity. A significant proportion of patients presented with associated ophthalmologic diagnoses, while nearly one hundred individuals demonstrated two or more concomitant ocular conditions. The coexistence of cataract with glaucoma-related pathology, retinal disease, and pseudophakia is clinically important because combined ocular disorders frequently complicate both diagnosis and long-term management. Similarly, the association between dry eye syndrome and blepharitis reflects the multifactorial and chronic nature of ocular surface disease [10].

The positive correlation identified between increasing age and the number of ophthalmologic diagnoses suggests progressive accumulation of ocular pathology throughout aging. Such findings correspond with broader concepts of multimorbidity observed in geriatric medicine and further support the need for comprehensive rather than isolated ophthalmologic assessment in elderly populations.

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An additional important aspect of the study was the observed regional variability in ophthalmologic disease distribution. Refractive disorders and ocular surface diseases appeared relatively more common within eastern and urban regions, whereas cataract, pseudophakia, and degenerative pathology demonstrated relatively higher prevalence in western and rural regions. These findings may reflect disparities in healthcare accessibility, screening frequency, socioeconomic factors, environmental exposure, occupational characteristics, and delayed clinical presentation. Similar regional inequalities in ophthalmologic healthcare accessibility have been described in international studies evaluating underserved populations and mobile eye care services [6,11].

The analysis of referral tendencies demonstrated that chronic degenerative and posterior segment diseases contributed disproportionately to the need for additional investigations and specialist consultations. Patients with cataract, glaucoma-related disorders, retinal abnormalities, and vascular retinal pathology frequently required OCT imaging, glaucoma evaluation, perimetry, follow-up visits, or surgical consultation. These findings highlight the increasing burden placed on tertiary ophthalmologic services by chronic age-related eye disease and further support the value of early screening initiatives aimed at reducing preventable visual deterioration.

Importantly, the present study also demonstrates the practical clinical value of charitable ophthalmologic programs organized by LIONS Eye Diabetic Clinic-Georgia in collaboration with Veterans Affairs State Service. Such initiatives enable identification of previously undiagnosed ocular pathology, improve access to ophthalmologic care in underserved regions, and facilitate referral of patients requiring specialized management. Community-based screening and mobile ophthalmologic services have re-

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peatedly demonstrated effectiveness in improving visual health outcomes internationally [2,4,6,19].

The study possesses several important strengths. First, it includes a relatively large patient population from multiple geographic regions of Georgia. Second, the analysis incorporated demographic, epidemiological, multimorbidity, referral, and regional distribution data, providing a broad overview of ophthalmologic disease patterns within the screened population. Third, the study reflects real-world ophthalmologic practice and screening outcomes, increasing the practical clinical relevance of the findings.

Nevertheless, several limitations should be acknowledged. The retrospective design may introduce documentation bias and incomplete data collection. The analyzed population consisted primarily of individuals participating in screening and charitable programs and therefore may not fully represent the general Georgian population. Additionally, some diagnoses were based on screening-level examination rather than advanced confirmatory diagnostics. The study also did not evaluate long-term follow-up outcomes, treatment efficacy, or progression of identified ophthalmologic disorders.

Future studies incorporating prospective longitudinal follow-up, broader nationwide epidemiological analysis, advanced imaging data, and evaluation of socioeconomic determinants may further improve understanding of ophthalmologic disease burden within Georgia. Additional investigation of healthcare accessibility and screening effectiveness in rural populations may also provide important public health insights.

Overall, the findings of the present study emphasize the major epidemiological burden of ophthalmologic disease within the Georgian population and reinforce the importance of screening-based ophthalmologic healthcare strategies. Early detection and

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timely referral remain critical components in prevention of avoidable visual impairment, reduction of blindness-related disability, and optimization of long-term ophthalmologic outcomes.

Conclusion

The present study demonstrated a substantial epidemiological burden of age-related, refractive, degenerative, and ocular surface ophthalmologic disorders within a large screening and clinical population in Georgia. Presbyopia, cataract, refractive abnormalities, and chronic ocular surface diseases represented the most frequent ophthalmologic conditions identified during the analyzed screening initiatives.

Increasing age demonstrated strong association with cataract formation, glaucoma-related pathology, pseudophakia, and ocular multimorbidity, emphasizing the cumulative nature of ophthalmologic degeneration in aging populations. The coexistence of multiple ophthalmologic disorders was common and reflected increasing complexity of clinical management among elderly patients.

Significant regional variability in ophthalmologic disease distribution was also observed, suggesting potential influence of healthcare accessibility, demographic structure, environmental exposure, and screening availability on ocular health outcomes across different regions of Georgia.

The findings further demonstrated the important role of charitable and community-based ophthalmologic screening programs organized by LIONS Eye Diabetic Clinic-Georgia and Veterans Affairs State Service in early detection of ocular pathology, identification of patients requiring specialist referral, and improvement of access to ophthalmologic care.

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Overall, the study highlights the clinical and public health importance of large-scale ophthalmologic screening initiatives in prevention of avoidable visual impairment and optimization of long-term visual health within the population.

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(ანოტაცია)

საკვანძო სიტყვები: ოფთალმოლოგიური სკრინინგი, კატარაქტა, პრესბიოპია, რეფრაქციული მანკები, გლაუკომა, ოფთალმოლოგიური მულტიმორბიდობა, ეპიდემიოლოგია, საზოგადოებრივი ჯანდაცვა, მხედველობის დარღვევა, საქართველო

კვლევის აქტუალობა

მხედველობის დაქვეითება დღეისათვის რჩება საზოგადოებრივი ჯანდაცვის ერთ-ერთ მთავარ გამოწვევად მთელ მსოფლიოში. თუმცა, შემთხვევების მნიშვნელოვანი

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ნაწილის პრევენცია შესაძლებელია ადრეული დიაგნოსტიკისა და დროული ჩარევის საშუალებით. მოსახლეობის ოფთალმოლოგიური სკრინინგის პროგრამები ხელს უწყობს რეფრაქციული მანკების, კატარაქტის, გლაუკომის, ბადურის დაავადებებისა და მხედველობისთვის საშიში სხვა მდგომარეობების გამოვლენას შეუქცევად დაკარგვამდე. პაციენტის ინდივიდური მკურნალობის შედეგების გაუმჯობესების გარდა, აღნიშნული პროგრამები იძლევა ღირებულ ეპიდემიოლოგიურ მონაცემებს, რომლებიც ხელს უწყობს ჯანდაცვის დაგეგმვასა და რესურსების ოპტიმალურ განაწილებას.

მიზანი

საქართველოში მოსახლეობის ოფთალმოლოგიური სკრინინგისა და კლინიკური შეფასების პროგრამებში მონაწილე პაციენტებს შორის დემოგრაფიული მახასიათებლების, ოფთალმოლოგიური პათოლოგიების გავრცელების, თვალის მულტიმორბიდობის (თანმხლები დაავადებების), რეგიონული ვარიაციებისა და რეფერალის (სპეციალისტთან გადამისამართების) საჭიროებების შეფასება.

მასალა და მეთოდები

ჩატარდა რეტროსპექტული ჯვარედინი სტატისტიკური ანალიზი საქართველოს სხვადასხვა რეგიონში ჩატარებული ოფთალმოლოგიური სკრინინგის აქციებიდან მიღებული მონაცემების გამოყენებით. არასრული სამედიცინო ჩანაწერების გამორიცხვის შემდეგ, საბოლოო ანალიზში ჩართულ იქნა 2038 პაციენტი. შეფასდა დემოგრაფიული მახასიათებლები, ოფთალმოლოგიური დიაგნოზები, თანმხლები ოფთალმოლოგიურიდაავადებები, რეგიონული განაწილება და სპეციალიზებულ კლინიკაში გადამისამართების ჩვენებები. დემოგრაფიული და კლინიკური მახასიათებლების შესაჯამებლად, გამოყენებულ

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იქნა აღწერილობითი სტატისტიკა. ხი-კვადრატის (χ^2) ტესტით შეფასდა კავშირი სქესს, დიაგნოზის კატეგორიებს, გადამისამართების საჭიროებებსა და რეგიონულ განაწილებას შორის. ერთფაქტორიანი დისპერსიული ანალიზით (One-way ANOVA) შედარდა ასაკობრივი განსხვავებები დიაგნოზების ჯგუფებს შორის. ბინარული ლოგისტიკური რეგრესიით შეფასდა კავშირი ასაკსა და კატარაქტის დიაგნოზს შორის, ხოლო სპირმანის კორელაციური ანალიზით – კავშირი ასაკსა და ოფთალმოლოგიურ მულტიმორბიდობას შორის. სტატისტიკური მნიშვნელობის დონედ განისაზღვრა $p < 0.05$.

შედეგები

კვლევის პოპულაციის საშუალო ასაკი იყო 57.97 ± 16.8 წელი, მედიანური ასაკი – 60 წელი. მამრობითი სქესის პაციენტები შეადგენდნენ კოჰორტის 55.3%-ს. ყველაზე ხშირად გამოვლენილ ოფთალმოლოგიურ დიაგნოზს წარმოადგენდა პრესბიოპია, რომელსაც მოჰყვებოდა კატარაქტა, ჰიპერმეტროპია, ასტიგმატიზმი, ფსევდოფაკია, მშრალი თვალის სინდრომი, ბლეფარიტი, მიოპია, გლაუკომა და კონიუნქტივიტი. ხი-კვადრატის ანალიზმა აჩვენა მნიშვნელოვანი კავშირი სქესსა და დიაგნოზის კატეგორიას შორის ($\chi^2 = 21.84$, $p = 0.015$). ერთფაქტორიანმა დისპერსიულმა ანალიზმა (ANOVA) გამოავლინა მნიშვნელოვანი ასაკობრივი განსხვავებები დიაგნოზირების ჯგუფებს შორის ($F = 46.27$, $p < 0.001$), ხოლო ლოგისტიკურმა რეგრესიამ აჩვენა, რომ ასაკის მატება დამოუკიდებლად იყო დაკავშირებული კატარაქტის დიაგნოზთან (OR = 1.069, $p < 0.001$). ოფთალმოლოგიური მულტიმორბიდობა ხშირი იყო – 383 პაციენტს აღენიშნებოდა სულ მცირე ერთი თანმხლები ოკულარული მდგომარეობა, ხოლო 99 პაციენტს – ორი ან მეტი თანარსებული დიაგნოზი. ხშირ დიაგნოსტიკურ კომბინაციებს

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შორის იყო: პრესბიოპია ჰიპერმეტროპიასთან, კატარაქტა ფსევდოფაკიასთან, კატარაქტა გლაუკომასთან დაკავშირებულ პათოლოგიასთან და მშრალი თვალის სინდრომი ბლეფარიტთან. რეგიონულმა ანალიზმა აჩვენა ვარიაბელობა დაავადებათა განაწილებაში: რეფერაქციული დარღვევები და თვალის ზედაპირის დაავადებები ჭარბობდა აღმოსავლეთ და ურბანულ (საქალაქო) რეგიონებში, ხოლო კატარაქტა, ფსევდოფაკია და სხვა დეგენერაციული დარღვევები შედარებით უფრო ხშირი იყო დასავლეთ და რურალურ (სასოფლო) რეგიონებში. რეფერალის საჭიროებები მნიშვნელოვნად განსხვავდებოდა დიაგნოზის მიხედვით – კატარაქტით, გლაუკომით, ბადურის პათოლოგიითა და ფსევდოფაკიით დაავადებული პაციენტები უფრო ხშირად საჭიროებდნენ სპეციალისტის მიერ შეფასებას.

დასკვნა

მოსახლეობაზე დაფუძნებულმა ოფთალმოლოგიურმა სკრინინგის პროგრამებმა გამოავლინა ასაკთან ასოცირებული, რეფრაქტიული და დეგენერაციული თვალის დაავადებების მნიშვნელოვანი ტვირთი საქართველოს მოსახლეობაში. ასაკის მატება მჭიდროდ იყო დაკავშირებული კატარაქტასთან და თვალის მულტიმორბიდობასთან. ამასთანავე, დაავადების განაწილებაში დაფიქსირდა მნიშვნელოვანი დემოგრაფიული და რეგიონული განსხვავებები. ეს მიგნებები გახაზავს ორგანიზებული სკრინინგული ინიციატივების მნიშვნელობას თვალის დაავადებათა ადრეული გამოვლენის, სპეციალიზებულ მოვლას დაქვემდებარებული პაციენტების დროული რეფერალისა და მხედველობის თავიდან აცილებადი დარღვევების პრევენციისთვის. შედეგები ასევე იძლევა მნიშვნელოვან ეპიდემიოლოგიურ მტკიცებულებებს მომავალში საზოგადოებრივი ჯანდაცვის დაგეგმვისა და მოსახლეობაში თვალის მოვლის სერვისების გაფართოების მხარდასაჭერად.

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