



PUBLIC HEALTH AND THE EYE

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High-risk Populations for Vision Loss and Eye Care Underutilization: A Review of the Literature and Ideas on Moving Forward

Angela R. Elam, MD,¹ and Paul P. Lee, MD, JD²

¹Department of Ophthalmology, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, USA; and

²Department of Ophthalmology, University of Michigan Kellogg Eye Center, Ann Arbor, Michigan, USA

Abstract. Much work has been done to highlight and understand the significant disparities in the use of eye care services, but they continue to exist. We review the existing literature on utilization in high-risk populations to provide a context for understanding what “high-risk” means, to understand the utilization patterns among high-risk populations, and to highlight barriers to appropriate eye care utilization. We also discuss potential approaches to reduce these disparities. (*Surv Ophthalmol* ■:■-■, 2013. © 2013 Elsevier Inc. All rights reserved.)

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Over 28 million adults in the United States suffer from one or more age-related eye diseases.²⁵ With the growing older population and increasing incidence of diabetes, this number is projected to rise. By 2020, the number of people with visual impairment and eye diseases could increase by 50% or more.¹⁰¹ Still, eye care access and utilization in the United States varies according to factors such as income, race, insurance, and having known vision or eye problems.^{14,20,66,67,87,93,101} Race/ethnicity and low-socioeconomic status appear to be independently associated with increased visual loss, placing poor ethnic minorities at highest risk.^{92,93} African Americans and Hispanics are significantly less likely to participate in vision screenings or use eye care services.^{14,20,66,79,99,101} Studies such as the Salisbury Eye Evaluation Study⁶³ have sought to determine the causes of blindness and visual impairment in

older Americans and found more than half had conditions that were either surgically treatable or potentially preventable. All individuals, especially those at high risk, should appropriately utilize eye care services.

There are many factors that may contribute to underutilization of eye care. In older African Americans in Alabama, transportation, trust and communication with the doctor, and cost of eye care are most often cited as barriers.⁶⁷ Dawn et al²² demonstrated that communication is the top expectation of patients seen at an academic center. Other barriers include lack of health insurance, cost, social support, other health problems, and fear of medical or surgical treatment. Identifying the expectations, reservations, and barriers of those who underutilize eye care services will help us to understand the needs of this population and better serve them.

In defining “high-risk” in eye care, one must do so in terms of vision loss, as well as underutilization of services. There are considerable similarities in the populations at risk for vision loss and those at risk for underutilization of care, yet the two concepts are separate. We shall first define high-risk populations for vision loss, then high-risk populations for underutilization of eye care services, as well as demonstrate the overlap seen between the two. We shall also identify barriers-to-care among these populations and suggest areas for improvement.

High-Risk Populations for Vision Loss

Defining high-risk populations for vision loss is no simple task. There is a wide range of eye diseases and conditions that lead to vision loss or blindness. So although there is some overlap in defining those at high risk for eye disease and resulting vision loss, each disease has its own specific set of risk factors. The major causes of vision loss in the United States include diabetic retinopathy, cataracts, glaucoma, age-related macular degeneration, and refractive error, as summarized in Table 1. We separate these into biological and sociocultural factors and by specific condition. Although we would like to also incorporate issues regarding children, there is much less literature in this area, particularly specific to vision care. As such, we focus on adult eye diseases in this review.

Risk factors and prevalence of ocular diseases often varies according to race. Use of the term “race” in the context of health and medical research continues to be controversial.^{32,41,49,63} The problem seems to lie in using race as a biological construct. Many believe that genetics disproves the theory of race-as-biology, and that race can be used as a social, political, or economic construct, but not a biological one.³² We will use “race” as a social proxy.

DIABETIC RETINOPATHY

Diabetic retinopathy is the leading cause of new cases of legal blindness in Americans aged 20–74 years.⁴⁷ Aside from having type 1 or type 2 diabetes, the most important risk factor is duration of disease.^{59,95} Poor glycemic control, insulin use, and elevated blood pressure are also implicated.^{36,59,77,95,99} Being a member of an ethnic minority group is a significant risk factor for the development and severity of diabetic retinopathy. Compared with white Americans, there is much higher prevalence of the disease among African Americans and Hispanic Americans, and they also tend to have more severe disease.^{3,36,63,71,95,99}

CATARACT

The leading cause of reversible blindness and the most common age-related cause of visual impairment globally is cataract.⁹¹ Cataract prevalence increases with age. Kahn et al⁴³ found that prevalence rose from 4.5% in 52- to 64-year-olds to 45.9% in those aged 75–85 years. A population-based study in East Baltimore⁸⁷ documented that cataract was four times more common among African Americans than white Americans. A higher prevalence among minority groups has been supported by subsequent studies.^{3,46,63,70} In addition to age and race, female sex, low socioeconomic status, history of smoking, and diabetes mellitus also increase the risk of cataract.^{24,40}

GLAUCOMA

Glaucoma is the leading cause of irreversible blindness among African Americans.⁹⁹ The etiology of glaucoma is still not completely understood, but epidemiologic research has helped to identify risk factors. Several studies have documented that those of African descent are as much as 15 times more likely to develop glaucoma than those of European descent.^{30,56,63,68,69,87} High intraocular pressure, thin central corneal thickness, positive family history, increasing age, corticosteroid use, and possibly myopia are risk factors or associations for development of glaucoma.^{2,16,31,51,56,58,72} There continues to be a question of the role of diabetes.^{23,31}

AGE-RELATED MACULAR DEGENERATION

Age-related macular degeneration (AMD) is the leading cause of irreversible blindness affecting people over age 65 in the western world.^{33,39} Besides increasing age, history of smoking tobacco is the best established risk factor for AMD.^{1,89,94} In addition, AMD disproportionately affects whites.^{1,3,63} Two studies conducted in Baltimore^{74,91} found AMD more frequent in white Americans than African Americans. Cardiovascular risk factors, such as increased total serum cholesterol and overall and abdominal obesity, may increase the risk for development and progression of AMD.^{1,83,89,94}

REFRACTIVE ERROR

Refractive error is a major cause of visual impairment worldwide, yet is easily correctable.⁸ It varies substantially with age, race/ethnicity, sex, and education level.^{8,44} Myopia in its severe form, it may be associated with vision-threatening conditions such as glaucoma and retinal detachment.²¹ Myopia is much more prevalent in older age

TABLE 1
Biological and Social/Cultural Associations for High-risk Populations in Major Causes of Vision Loss and Blindness

	Diabetic Retinopathy	Cataract	Primary Open-Angle Glaucoma	Age-related Macular Degeneration	Refractive Error
Age	Risk increases with older baseline age ⁵⁹ and older age ⁷⁷ (no significant difference ⁶)	Risk increases with age ^{5,24,40,43,46}	Prevalence increases with age ^{7,31,56,72}	Prevalence increases with age ^{1,4,33,83,89,94}	More prevalent in younger age (myopia) ^{8,44} More prevalent in older age (hyperopia) ^{8,44}
Sex	No significant difference ⁶	Higher prevalence in females ^{5,24,40}	Increased risk in males ^{31,56} No significant difference ⁷	No significant difference ⁴	Prevalence higher in females (hyperopia) ⁴⁴
Family history/ Genetics			Positive history increases risk ^{31,56,72}	Presence of complement factor H variant increases risk ³⁴	High heritability in myopia/hyperopia ³⁵
Other	Risk increases with duration of diabetes, ^{59,95} poor glycemic control, ^{36,59,77,95,F} elevated blood pressure, ^{36,59,77,95,F} and insulin use ^{38,62,81,100}	Presence of diabetes mellitus increases risk ^{24,40}	Risk increases with ocular hypertension, ^{31,51} increased cup:disk ratio, ^{31,56,72} corticosteroid use, ⁷² myopia, ^{51,58,72} and vascular/heart disease (i.e., diabetes) ^{31,56,72} No increased risk with diabetes ²³ Decreased risk with diabetes ³¹	Presence of cardiovascular risk factors (e.g., increased total serum cholesterol) ⁸⁹ and BMI/obesity ^{1,83} increase risk	
Race/ Ethnicity	Risk greatest for Latinos > Blacks ^{3,6,36,63,95,99} > Whites	Higher prevalence among black patients ^{5,24,40,43,46,63,70}	Prevalence greatest in black patients ^{3,7,56,63,68,87,99}	Prevalence greatest in whites ^{1,3,4,63}	Prevalence highest in white patients ^{8,44}
SES		Higher prevalence among low SES individuals ^{24,40}			Prevalence increases with higher education (myopia) ^{8,44,90} Prevalence increases as level of education decreases (hyperopia) ^{8,44,90}
Tobacco Use		Positive use increases risk ⁴⁰		Positive use increases risk ^{1,89,94}	

SES = socioeconomic status.

groups, regardless of race/ethnicity.^{8,44} Myopia is less common in blacks than whites.^{14,44} The Los Angeles Latino Eye Study⁹⁰ established that the burden of myopia in the United States is greatest among older Latinos. Education has been strongly associated with myopia.^{8,44,90} Risk of hyperopia appears to increase with age, less education, and is most prevalent in white men.^{8,44,90}

SUMMARY OF FACTORS

There appear to be several recurring factors, as seen in Table 1. Zhang et al¹⁰¹ defined high-risk for vision loss in the United States as (1) being age 65 or older; (2) having diabetes mellitus; and (3) already having an ocular disease or condition that could result in permanent visual loss or reporting visual symptoms or activity limitations. Though neither race/ethnicity nor socioeconomic status was used to define high-risk, the literature does indicate that these two factors are essential when discussing eye disease. Therefore, we conclude that consistent high risk factors for eye disease and resulting vision loss are (1) increasing age; (2) racial/ethnic minority; (3) presence of diabetes mellitus; and (4) low socioeconomic status.

High-risk Populations for Underutilization of Eye Care

With an aging population, understanding the issues surrounding access to and utilization of eye care services becomes increasingly important. Services are utilized less often in certain populations, and the definition of high-risk for underutilization varies with different studies in different locations. The American Academy of Ophthalmology offers guidelines for frequency of eye examinations according to age and risk factors.^A Eye examinations are recommended for all persons aged 65 and older with no risk factors every 1–2 years.^A Those aged 40–54 years and 55–64 years with no risk factors should have exams every 2–4 and 1–3 years, respectively.^A Individuals with risk factors or conditions that require interventions should be examined by an eye care provider more often.^A Not having had an eye examination within the recommended time period, or not at all, would be considered underutilization of eye care services.

Methods used to determine utilization patterns include self-reports, claims data analyses, and chart reviews. Each method has its strengths and limitations in terms of interpreting the data. Self-reports, although providing information directly from the patient, require the researcher to rely on the patient's memory, interpretation of events, knowledge, and so on. Many clinical studies exploring eye

care utilization, such as that of Lee et al,⁵⁵ have relied on asking patients for self-report for data. Others have used claims data analysis⁵⁴ and patient chart reviews³⁰ to provide objective data helpful in determining patterns of care and utilization. All of these methods are limited by missing information, such as provider characteristics, provider recommendations, and patient perspectives.

The Melbourne Visual Impairment Project sought to assess the utilization patterns of Australians who would most benefit from eye care, such as those with undiagnosed glaucoma, unoperated cataract, undercorrected refractive error, diabetes mellitus and AMD.¹⁸ Younger age, male sex, and language other than English were markers for people who did not properly utilize eye care, but could most benefit from it.¹⁸ More needs to be done to ensure appropriate access and utilization of eye care among all the sexes, racial/ethnic groups, and socioeconomic levels.

AGE

As seen in Table 1, because the risk of visual impairment or blindness increases with age, it is important to recognize the utilization patterns of the older population. The SEE Project⁶⁶ with older Americans used the self-reporting method to determine that eye care utilization is highest among women, whites, and older age groups. In that study, a report of having seen an eye care specialist varied from 41% in the 65–69 years age group to 65% in the 80+ years age group, with stepwise increase in between. Those with known ocular disease, diabetes, or additional health insurance had higher rates of eye doctor visits and dilated eye examinations.^{66,101} Even so, only 54.8% of adults with vision or eye problems and 62.9% of adults with diabetes had had a dilated examination in the past 12 months.¹⁰¹ The Academy recommends at least annual exams for individuals in this age group.^A

RACE/ETHNICITY AND SOCIOECONOMIC STATUS

Race is a significant variable in eye care utilization rates across all age groups. Despite the fact that they are more likely to suffer visual impairment and blindness, African Americans and Hispanics are much less likely to be seen by an eye doctor or have a dilated eye examination than their white counterparts.^{14,20,66,79,85,99,101} The SEE Project found that black patients were much less likely to have seen an eye care provider in the past year as compared to white patients (50% vs 69%).⁶⁶ Socioeconomic status plays a large role in these racial/ethnic disparities. Socioeconomic status (SES), most often assessed by proxies such as income, education, or

occupation, is closely tied with the differences seen in health care access and utilization.^{9,12,17,97} These indicators of socioeconomic status are heavily correlated with race, making the racial/ethnic differences seen in health care partly produced and sustained by socioeconomic factors.^{10,12,17,97}

Indeed, the disparities in health by socioeconomic status within each racial group are often larger than the overall racial/ethnic disparities in health.^{96,97} The inverse relationship between socioeconomic status and health care has been well documented.^{28,29,80,96} Although there is substantial variation in health between minorities and whites, the utilization difference related to socioeconomic status within each racial group is larger than the racial differences across the groups.⁹⁶ Patients with low socioeconomic status, regardless of race or ethnicity, receive less preventive health care, including eye examinations.²⁹

INSURANCE STATUS

Insurance status is another related critical variable in the United States. Over 46 million Americans are without health insurance, many of them disproportionately being of low SES.^{75,B} The uninsured use a significantly lower amount of recommended health care services than do those with insurance.^{64,75} Nelson et al⁶⁴ found that the uninsured were less likely (42%) to have received a dilated eye exam in the past year compared with those with private insurance (69%). In another study, persons with no health care coverage were twice as likely to have not had an eye exam in the previous year.⁶⁵ In a comparison of lower-income and higher income uninsured adults,⁷⁵ lack of insurance was associated with significantly decreased use of health care services, including eye exams. Oladele et al⁶⁵ showed that individuals of lower socioeconomic status and uninsured individuals are at greatest risk for not having eye examinations. Those without any insurance coverage are almost all under age 65, more likely to be African American or Hispanic, and have lower incomes and less education than the insured.⁶⁴

Optional vision insurance was found to be independently associated with eye care utilization regardless of the particular type of general health insurance.¹⁰⁰ Additional general health insurance coverage may not be as helpful, however. For example, the majority of persons over age 65 have health insurance coverage through Medicare, yet even within the Medicare population, disparities in utilization exist. A longitudinal analysis demonstrated substantial “gaps” in care in over half of the Medicare beneficiaries studied, with as few as 50–60% of subjects with diagnosed diabetes receiving eye care in a 15-month period.⁵⁷ Sloan et al⁸⁵

determined that supplemental insurance coverage was not a major factor in utilization among those with Medicare when a large number of other variables were accounted for, including social support, density of providers, and wealth and income. In the cohort of elderly individuals studied in the National Long Term Care Survey, having supplemental insurance did not significantly affect utilization.⁸⁵ Similarly, in a comparative study of self-reported ophthalmic care, there was no difference between utilization of eye care for diabetes in managed care and fee-for-service patients, suggesting that having insurance is more important than its specific nature.⁵⁵

Barriers to Care: Perceptions and Expectations

Along with the study of why health disparities exist and how to eliminate them has come the development and integration of several theories and models of human behavior. Two in particular, the Health Belief Model and the Social Learning/Social Cognitive Theory, are quite relevant to understanding the barriers to care. They both highlight the role of perceived outcomes of behavior and the influence of those perceptions of control over the behavior.^{15,73,D} These models have been applied to a wide range of health behaviors, such as smoking, mammography use, and contraceptive practices.^{19,37,45,74,88,C}

Community-based research studies have been useful in determining barriers to eye care utilization (Table 2). Baker et al¹⁴ found affordability and lack of physician recommendation to be closely associated with underuse of eye care. The CDC identifies behavior/cultural barriers as most substantial with regards to eye care.²⁵ These barriers include belief system, trust issues, education level, language, concordance between physician and patient, health literacy, and immigration status.²⁵ Geographic access/resources and financial barriers also have an impact on utilization.²⁵ In the Medicare population access barriers, such as difficulty finding an eye care provider, lack of transportation, caregiver time constraints, cost, and paperwork, continue to exist.^{54,85} In addition to these, lesser anticipated benefits of care and co-existing major illnesses or near death status appear to be barriers to using eye care.⁸⁵

Several studies have used focus groups as a means to learn more about patients' perceived barriers to, attitudes about, and expectations for vision and eye care.^{22,27,67} In a sample of older African Americans in Alabama, Owsley et al⁶⁷ found that accessibility, namely, inadequate transportation resources, trust of the doctor, communication with the doctor, and cost of eye care, were the most frequently cited

TABLE 2

Summary of Barriers to Eye Care

Cost	^{25,27,38,54,67,85}
Insurance	^{25,38,54,64,65,67,85}
Patient-provider communication	^{22,25,38,67}
Trust	^{25,27,67,85}
Lower literacy level	²⁵
Lack of transportation	^{38,54,67}
Provider accessibility	^{38,54,67,85}
Belief system	^{25,67}
Poor social support	^{54,67,85}
Lower educational level	^{25,27,38,67}
Lack of symptoms/no need	²⁷
Denial/pride	²⁷
Fear	²⁷
Lack of time	²⁷
Overshadowing of comorbidities	^{38,85}
Being near death	⁸⁵
Language	²⁵
Immigration status	²⁵

barriers. Previous research suggests underutilization rates are quite high in older African Americans. Yet in that study, most of the participants' attitudes about vision and eye care were positive, particularly placing high value on good vision and knowing the importance of seeking eye care.

Cost and lack of sufficient insurance were considered the biggest barriers in a focus group study of African Americans in Baltimore conducted by Ellish et al.²⁷ Other reasons given by this group included not experiencing symptoms, inconvenience, and being busy. The patient-physician relationship was also noted to be a barrier-to-care for some in this study. Issues of trust, empathy, and communication with doctors were identified as affecting attitudes toward eye care utilization.

Lack of knowledge or understanding about eye diseases and preventive eye care seems to be a key factor in accessing eye care.¹¹

These qualitative tools have also been directed at physicians to gather their ideas on barriers to eye care and show that there is a disconnect in the patients' perceived barriers and those of physicians.⁶⁷ A qualitative study of diabetic patients and physicians in New Orleans³⁸ showed that whereas patients cited financial burdens as the major barrier, physicians did not mention finances at all. In the same study, physicians cited patient knowledge of diabetes as the major barrier to care, whereas patients felt they had adequate knowledge. Owsley et al⁶⁷ demonstrated there is a mismatch between older African Americans' perceptions of their knowledge and attitude toward vision and eye care and how eye care providers view them. Patients viewed communication with the doctor as a major barrier to care, yet eye care providers did not identify this as a frequent barrier.⁶⁷ When asked

about the attitudes of older African Americans toward vision and eye care, eye care providers gave predominantly negative comments, in contrast to the older African Americans who expressed mostly positive attitudes.⁶⁷ These findings shine an important light on patient-physician interactions and how they may contribute to disparities in eye care. There also appears to be a disconnect between primary care and eye care providers regarding the current referral process.⁴² In a focus group study of primary care physicians, poor communication from eye care providers was cited as the most common barrier.⁴²

What expectations do patients have regarding eye care? Are eye care providers meeting those expectations, and, if not, does this contribute to the underutilization of eye care in high-risk populations? Dawn et al²² developed a pilot study using focus groups to gain an understanding of concerns that patients express as expectations. Patients were recruited and grouped based on the presence of either blinding or non-blinding eye conditions and as either lower or higher socioeconomic status.²² The focus groups were moderated using a script that was based on extensive literature review and reflected the most commonly addressed areas of patient expectations.²² As such, it is not surprising that communication—particularly honesty, information about diagnosis and prognosis, explanation in clear language, and listening/addressing concerns—emerged as the greatest expectation among these patients.²² In addition, these patients indicated the importance of an ophthalmologist's experience/reputation, as well as their interpersonal manner, particularly a sense of empathy and personal connection.²²

Moving Forward to Increasing Eye Care Utilization

We conclude that, even though defining groups at high risk for vision loss varies with eye disease or condition, minorities, people of low SES, and the elderly appear to be at greatest risk for vision loss. Despite their increased risk, members of minority groups, those of low SES, and the uninsured do not use or receive adequate eye care. Patients have expectations that, if unmet, may influence utilization, and patients' perceived barriers and attitudes toward eye care differ significantly from physicians' views. Determining ways to reach high-risk populations in eye care is a complex task and requires further careful and innovative work (Table 3).

RACE/ETHNICITY AND SOCIOECONOMIC STATUS

Racial disparities that persist in eye care are consistently present and could be a result of various factors. Interestingly, both low SES and race/

TABLE 3

Modifiable Factors that may Increase Utilization

By Provider/Healthcare System	By Patient	Government
Improve communication (listening skills, honesty, simplify language, etc.)	Improve health literacy	Improve transportation resources
Increase community health education initiatives	Improve communication with providers	Decrease number of uninsured/underinsured individuals
Simplify patient educational material		
Make services more affordable		
Increase services in low SES communities		
Increase number of minority providers		
Improve cultural competency		

SES= socioeconomic status.

ethnicity are independently associated with increased risk for blindness and vision impairment, yet within a socioeconomically homogenous population there is no association between race/ethnicity and eye care utilization.¹⁴ As education and income are often used as indicators of socioeconomic status,^{9,12,17,97} there is no surprise that adults with higher education and greater incomes are more likely to utilize eye care services.¹⁰¹

Pertinent to the discussion of disparities in utilization based on race/ethnicity or socioeconomic status is the topic of availability of resources. Communities with high proportions of minority residents are as much as four times more likely than non-minority communities to have a shortage of physicians, regardless of community income.⁴⁸ Sloan et al⁸⁵ found substantial racial disparities in receiving eye exams, in part, related to the distance from providers. Minorities are more likely to have to travel outside of their neighborhoods to be seen by a physician, raising the issue of transportation resources and the need for ways of bringing resources closer to poorer neighborhoods. As mentioned previously, lack of adequate transportation was a major barrier to older African Americans in receiving eye care.⁶⁷ In a study seeking to improve adherence to pap smear screening follow-up, transportation incentives such as bus passes and parking permits had a positive impact on patients of low socioeconomic status and those without insurance.⁵⁷ Komaroy et al⁴⁸ found that black and Hispanic physicians are not only more likely to practice in minority communities, but also care for more Medicaid and uninsured patients. Thus, increasing the number of minority eye care providers may be effective in improving utilization of eye care. By increasing access to and utilization of eye care services in poor and minority populations, a large portion of high-risk individuals are addressed, therefore leading to a decrease in disparities in eye care.

CULTURAL COMPETENCY

Another issue is cultural competency of the providers. Though there has been no direct evidence that provider biases negatively affect quality or utilization of care, patients' race/ethnicity influence providers' feelings about patients, as well as their diagnostic and therapeutic decisions.⁸⁶ More often than not, a minority patient will receive eye care from a physician who does not share the same ethnic background or culture.⁶⁰ Regardless of race, patients of low SES will most likely be seen by eye care providers from a higher socioeconomic class.⁸⁶ The Institute of Medicine identified cross-cultural training as a key recommendation for reducing healthcare disparities.⁸⁶ Educational and practical tools focusing on cultural competency would be a useful resource for all eye care providers and their staffs, especially those who treat patients of a different race, ethnicity, or social background. More cultural sensitivity from providers may decrease alienation of these high-risk groups. Compared with other barriers, such as cost, transportation, and insurance, improved cultural competency and sensitivity may only address a small portion of disparities seen in eye care, but cultural competency merits more attention.

LITERACY AND HEALTH LITERACY

Addressing poor health literacy may become an effective means of decreasing disparities in eye care. Healthy People 2010 defines health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.^E In one study, including health literacy in predictive health status models removed the predictive power of both education and being African American, clearly demonstrating its importance.⁸⁴ Low-literacy interventions have proven useful for patients with diseases such as diabetes and

prostate cancer.^{50,76} Adequate health literacy is particularly important for those with chronic diseases, such as diabetic retinopathy and glaucoma, as it is major barrier in educating them about their disease, and thereby improving care.⁹⁸ We know that people with limited health literacy skills are less likely to use preventive services and more likely to present with more severe disease.⁸² In 1997 Ebrahimzadeh et al²⁶ found that the majority of ophthalmic patient education materials were above the recommended reading level for most patients. Measures of health literacy, such as the Rapid Estimate of Adult Literacy in Medicine and others, closely correlate with tests of standard literacy.¹³ Simplifying educational material, determining through what means an individual patient learns best, and providing education through that means will serve as key first steps in responding to the issue of low health literacy in eye care patients.⁵³

MEDICARE AND INSURANCE COVERAGE

Although not all of America's uninsured population belongs to the lower SES group, more than 60% do.⁹ Medicare covers eye care services for those 65 years and older, leaving most of the uninsured under this age. Knowing that much of the vision loss seen in minority and socioeconomically disadvantaged communities is preventable or treatable in the early stages, providing insurance to those who have a lack of insurance may be a critical factor in reducing rates of blindness. This is not to suggest that Medicare eliminates disparities in utilization among its beneficiaries. In a longitudinal analysis of Medicare claims data, Lee et al⁵⁴ demonstrated that over half of their patients had at least one 15-month gap in eye examinations. Furthermore, they show that there seems to be a subset of patients for whom noncompliance is recurrent, noting that despite Medicare coverage, some still faced other barriers such as transportation problems, out-of-pocket expenses, and difficulty finding providers.⁵⁴

Modifications to the existing health care system are needed to ensure that lack of health insurance and affordability are no longer contributing factors in vision loss and blindness. Implementing systems and policy changes that support prevention of eye disease and vision impairment are key.²⁵ Based on work by Lee et al,⁵² securing health care coverage for uninsured Americans would improve overall ocular health and low eye care utilization rates. Vision health interventions should be integrated into existing and future health programs that target prevention and chronic diseases.²⁵ The Melbourne Visual Impairment Project team suggested the

inclusion of vision testing for older Australians as part of regular aged care assessment and improved access and coverage of low cost/free spectacle services as a means to improve utilization of eye care services among its high-risk citizens.¹⁸

EYE CARE EDUCATION

Many individuals, including those with diabetes and the elderly, do not seek care in a timely manner or continue with essential follow-up care.²⁵ Community-wide and individual education and behavior change models may help to change this. Establishing interventions to address behavioral changes and inform, educate, and empower people about health issues should be part of the effort to eliminate disparities in eye care.²⁵ These educational interventions may increase awareness of the importance of regular maintenance of vision health and health lifestyle behaviors.²⁵ An increase in utilization was seen after an eye health campaign in Australia.⁶²

Indeed, all of the suggestions to improve education must be tempered by reality. Educational efforts have proven useful, but limited, in other fields of medicine. In a study to determine the risk perceptions and prevention choices in high-risk women with breast cancer, many women, despite knowing their status, did not view themselves as being high-risk because they were not experiencing any signs or symptoms.⁷⁸ The idea of risk perception is also important in eye care, as eye diseases such as glaucoma and diabetic retinopathy may not be symptomatic until the preferable stage of treatment has passed. The World Health Organization suggests that public awareness about diabetic retinopathy is lacking around the world and that health education campaigns should be intensified.^F Simple efforts, such as an information pamphlet to be read while waiting to be seen by the doctor, encourage patients to be more involved in their care and lead to better understanding of their disease, perhaps fostering better compliance and adherence to follow-up guidelines.⁵⁰

DOCTOR-PATIENT RELATIONSHIP

Trust and communication are not only expectations of eye care patients, but also perceived barriers.^{22,67} Patients value open and honest communication with their physician about their vision and eye care. When patients do not have a suitable relationship with their physician, it will likely be viewed as an unmet expectation, which then becomes a barrier to receiving care. Ironically, eye care providers do not view communication with the patient as a barrier to care.⁶⁷ This suggests that

providers may not be aware of the communication problems and the effect these problems may have on eye care utilization. Education initiatives in high-risk communities would increase knowledge about eye disease and the importance of preventive eye care. Training or educational modules may be useful for providers in the areas of listening, communication, and developing rapport with patients.

Conclusion

Much work has been done to identify high-risk populations in eye care. Utilization of eye care services differs among age groups, sexes, races/ethnicities, and socioeconomic levels. Several groups have even determined perceived barriers to care by directly asking patients themselves. There is still more information needed, however. A next step in reducing disparities in eye care is to seek the input of high-risk individuals on ways to improve their care. Understanding more about why they underutilize eye care and, more importantly, what they feel needs to be done to change the eye care system will be a start in providing adequate care to all people.

Method of Literature Search

We performed a systematic review of the existing literature to answer the following questions:

1. What defines “high risk” for vision loss in eye care?
2. Who is at “high risk” for not using eye care?
3. What are some of the barriers that hinder certain groups from obtaining proper eye care?

An initial Medline search was performed on September 3, 2007, and again on April 18, 2010, surveying literature published in English from 1966 to 2010, using combinations of relevant key words. The initial Medline search terms were the following: *high risk, utilization, eye care*, in various combinations with *barriers, disease, population, glaucoma, diabetic retinopathy, cataract, refractive error, macular degeneration, race, and socioeconomic status*. After review of abstracts, relevant articles were retrieved and reviewed. The reference lists of the relevant articles and also review articles were examined to identify other relevant articles. We excluded letters, as well as citations from pediatric or nursing literature.

Disclosure

The authors reported no proprietary or commercial interest in any product mentioned or concept discussed in this article.

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Reprint address: Angela R. Elam, MD, Department of Ophthalmology, University of Pittsburgh Medical Center, 203 Lothrop Street, Pittsburgh, PA 15213. e-mail: elamar@upmc.edu.