CASE STUDY

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Prevalence of Visual Impairment and Eye Diseases in Arkansas

Abstract

Visual impairment and eye diseases are major public health concerns of the 21st century, particularly as our population ages. The prevalence of these conditions has not been described in Arkansas. We analyzed the vision module of the Arkansas behavioral risk factor surveillance system to estimate the burden due to these disabling conditions. The prevalence of glaucoma, age-related macular degeneration, and cataract among Arkansans > 40 years was found to be 5.5% (95% CI, 4.7 – 6.3), 5.3% (95% CI, 4.5 - 6.0), and 13.7% (95% CI, 12.6 – 14.8), respectively. Vision related quality of life was also studied. Public health strategies to reduce the burden due to visual impairment and eye diseases are the need of the hour.

Introduction

Visual impairment is one of the major public health problems in the United States. In 2000, there were approximately 937,000 people who were blind in the United States alone.[1] It is estimated that this number will reach to 1.6 million by 2020.[1] As our population ages, the burden due to visual impairment and eye diseases is expected to rise. Age-related macular degeneration is the leading cause of blindness among White Americans 40 years and older.[1] Glaucoma and cataract account for more than 60% of blindness among African-Americans.[1] Visual impairment, regardless of its cause, is known to have impact on health-related quality of life.[2-4] The extent and nature of visual impairment and eye diseases in Arkansas have not been well described.

Methods

The Behavioral Risk Factor Surveillance System (BRFSS) is an annual survey conducted by 50 states and the District of Columbia to obtain state-specific information on health risk behaviors.[5] The survey uses a random digit dial telephone methodology designed and developed by the Centers for Disease Control and Prevention. Disproportionate stratified random sampling is used to identify eligible participants. Participants are non-institutionalized adults >18 years of age, and only one adult is interviewed per household.

In 2005, the BRFSS added Visual Impairment and Access to the Eye Care module to the survey to better understand visual impairment for individuals aged 40 years and older. First five states using this module were Iowa, Louisiana, Ohio, Tennessee, and Texas.[6] Next year, nine states including Arkansas administered the module. There were a total of 10 questions in this module. Participants were asked if they had been told by a health care professional that they have any eye diseases including glaucoma, cataract and age-related macular degeneration. Participants were also asked the frequency of their visits to the eye doctor, the reasons for infrequent visits, and eye insurance status. In addition, there were two questions about vision specific health related quality.

1) "How much difficulty, if any, do you have in recognizing a friend across the street?"
2) "How much difficulty, if any, do you have reading print in newspaper, magazine, recipe, menu, or numbers on the telephone?" Response options were "no difficulty," "a little difficulty", "moderate difficulty," "extreme difficulty," "unable to do because of eyesight," "unable to do for other reasons."

The analytic sample consisted of 893 respondents who reported one or more of the following eye diseases: glaucoma, age-related macular degeneration and cataract, and 3,102 respondents who did not report any of three eye diseases mentioned above nor diabetic retinopathy (no eye disease group). Information about diabetic retinopathy was obtained from diabetes module in the same survey.

Results

The prevalence of glaucoma, age-related macular degeneration, and cataract among Arkansas survey respondents > 40 years was found to be 5.5% (95% CI, 4.7 – 6.3), 5.3% (95% CI, 4.5 - 6.0), and 13.7 % (95% CI, 12.6 – 14.8), respectively. (Table 1) The prevalence of glaucoma, age-related macular degeneration and, cataract was higher among the females and those who had an annual income under $25,000 compared to those who had an annual income more than $25,000. A higher proportion of people with age-related macular degeneration could not recognize a friend across the street, and had more difficulty in reading prints (30.1% and 52.6%, respectively) (Table 2).

Discussion

This is the first report that examined the prevalence of eye diseases (glaucoma, age-related macular degeneration, and cataract) in Arkansas. The prevalence of glaucoma and, age-related macular degeneration increased with age. This finding is consistent with previous reports.[6,7] Cataract prevalence was much higher among adults between ages 65-84 than ages 40-64; however, prevalence decreased in oldest age group (> 85 years). This could be explained by surgical treatment for cataract in this age group. Among the respondents, 11.8% stated "cataract has been removed;" this rate was higher than pre-

vious report by the Eye Diseases Prevalence Research Group.[1]

The State of New York conducted Visual Impairment and Access to the Eye Care survey among residents 40 years of age and older in the same year as Arkansas. The prevalence of age-related macular degeneration was higher (5.3% vs. 4.1%) and the prevalence of cataract was lower (13.7% vs. 19.0%) in Arkansas compared to New York. However, the prevalence of glaucoma was similar (5.3% vs. 5.5%) in both states.

Vision related quality of life (VRQL) is an important indicator of overall vision health. VRQL was assessed among the survey respondents by their ability to recognize a friend across the street and read print materials. A higher proportion of Arkansans with age-related macular degeneration reported having a poor VRQL compared to those with other eye diseases and those without any eye disease. Since age-related macular degeneration primarily affects central vision, it is understandable that the respondents had more difficulties in recognizing a friend across the street and in reading print materials. On the other hand, glaucoma causes central vision loss in only advanced stages of the disease. This could be the reason that vision related quality of life had a higher impact on people with only age-related macular degeneration.

One of the limitations of this study was that the prevalence of the eye diseases reported here was an estimate based on self-reported information from survey respondents. Therefore, the accuracy of the participants' responses could not be confirmed. Furthermore, previous studies have shown that almost half of those with chronic eye conditions were not aware of their eye problem.[8] Despite the fact that true prevalence of the diseases may not be known based on any type of survey, this report and previous BRFSS reports underline three consistent findings: 1) Prevalence of eye diseases varies from State to State, 2) Prevalence of glaucoma, age-related macular degeneration, and cataract increases with age, 3) Females and individuals with low-income are at higher risk for having eye diseases. Hence, developing state-specific programs to meet the demands of aging and vulnerable populations is recommended. There is strong evidence that unhealthy habits such as smoking and consuming a diet with high fat and low anti-oxidants increases the risk of cataract and age-related macular degeneration in addition to increasing the risk of cardiovascular disease.[9-10] Since vision is often valued as one of the most important health assets by individuals, it is suggested that in addition to drawing attention to periodic eye examinations to detect the eye diseases early, emphasizing healthy behaviors

Table 1. Weighted prevalence of self-reported glaucoma, age-related macular degeneration and cataract per hundred Arkansans > 40 years of age

Variable	Glaucoma		Macular degeneration		Cataract	
	%	CI	%	CI	%	CI
Age*						
40-64 years	3.9	3.0-4.8	3.2	2.4- 4.0	6.9	5.9-7.9
65-84 years	8.1	6.5-9.8	9.0	7.2-10.8	29.0	26.4-31.6
≥ 85 years	17.9	10.1-25.6	13.1	6.1-20.2	22.0	13.1-30.9
Gender†						
Male	4.3	3.1-5.4	4.1	3.0-5.2	10.8	9.2-12.4
Female	6.6	5.5-7.6	5.9	4.9-7.0	15.6	14.1-17.0
Race/ethnicity						
Non-Hispanic White	5.2	4.4-6.0	5.5	4.7-6.4	14.2	13.0-15.4
Non-Hispanic Black	7.5	4.4-10.7	2.5	0.2-4.8	8.6	5.4-11.8
Hispanic	3.8	0.0-7.7	2.4	0.0-5.3	12.0	4.9-19.1
Non-Hispanic/Others	9.8	1.5-18.1	6.4	0.5-12.3	12.9	4.7-21.0
Education						
Non-high school graduate	7.6	5.0-10.2	6.5	3.9-9.1	15.4	
High school graduate	5.7	4.4-7.0	5.2	3.9-6.4	14.1	12.1-18.7
Some college	4.0	2.8-5.2	5.7	4.1-7.2	13.4	11.2-15.6
College graduate and more	5.6	3.9-7.2	4.3	2.9-5.7	12.7	12.3-16.0
						10.6-14.8
Income§						
Less than $10,000	8.5	4.8-12.2	6.6	3.4-9.7	13.9	9.6-18.2
$10,000-24,999	7.6	5.7-9.4	7.9	5.8-10.0	17.6	15.0-20.1
$25,000-49,999	4.4	3.0-5.9	5.0	3.5-6.4	13.2	11.1-15.4
$50,000 or more	3.5	2.3-4.7	3.6	2.5-4.8	8.9	7.3-10.5

*Prevalence increased by age for all 3 eye diseases. ($p < 0.05$)

† Prevalence of all 3 eye diseases was higher among females than males. ($p < 0.05$)

§ Prevalence of all 3 eye diseases was higher among respondents with annual income lower than $25,000 than other income groups. ($p < 0.05$)

Table 2. Comparison of vision related quality of life among those with and without eye diseases.

	No eye disease		Glaucoma		Macular degeneration		Cataract	
	%	CI	%	CI	%	CI	%	CI
Difficulty in recognizing friend across the street	16.1	14.8-17.6	20.4	12.5-28.4	30.1*	21.3-38.9	18.1	14.4-17.6
Difficulty in reading print materials	33.1	31.3-34.8	29.7	20.2-39.1	52.6*	42.6-62.6	33.4	28.8-37.9

* P < 0.05

to protect the vision could have positive impact on the eye health in long term.

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