A Survey of Eye Disease in Adult Latino Patients in Boston: A Community Health Center Perspective

Amy R. Moy, Kristen Brown, Elizabeth Hoppe, Li Deng, Linh Trang


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A Survey of Eye Disease in Adult Latino Patients in Boston: A Community Health Center Perspective

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Abstract

INTRODUCTION The purpose of this study was to survey the prevalence of ocular disease and associated systemic conditions in an adult Latino population of mostly Caribbean individuals seeking eye care in two Boston community health centers.

METHODS Records of 301 Latino patients more than 40 years old were reviewed in a retrospective chart study from Eye Clinics in two community health centers. Data was collected on demographics and ocular diagnoses including cataracts, glaucoma, diabetic retinopathy, and macular degeneration (AMD), as well as hypertension and dry eye.

RESULTS 223 of the 301 (74%) eligible patients were female. 62.1% were Dominican, and 22.6% were Puerto Rican. 91 patients (30.2%) had Type II diabetes, 20 (6.6%) had diabetic retinopathy; 13 patients (4.32%) had glaucoma; 186 patients (61.8%) had cataracts; and 1 patient had AMD. In addition, 113 patients (38.70%) had hypertension and 62 patients (21.23%) had dry eye.

CONCLUSION Adult Latino patients seeking eye care in the two health centers were mainly female, of Caribbean descent, and likely to have nuclear sclerosis and dry eye. There was a low prevalence of diabetic retinopathy, AMD and open-angle glaucoma. More research is needed to understand the ocular health of Latinos, the fastest growing minority group in the United States.
Introduction

This study seeks to survey the prevalence of common ocular and systemic conditions in a self-selected population of adult Latinos seeking eye care from two Boston eye clinics in community health centers. In addition, the results of the study will contribute to the greater knowledge and understanding of ocular disease for certain subsets of Latinos of Caribbean descent, since the majority of our sample of Latino patients were from the Dominican Republic and Puerto Rico.

Latinos are the fastest growing segment of the population in the United States. As of July 2006, Latinos made up 14.8% of the US Population of 299 million (US Census Bureau, 2009). Latinos are projected to make up 20.1% of the US population by the year 2020 (US Census Bureau, 2009). The term “Hispanic” is widely ambiguous, but generally refers to a member of an ethnic group that traces its roots to 20 Spanish-speaking nations from Latin America and Spain (Passel and Taylor, 2009). The term “Latino” is viewed as more socially comfortable, less formal, and refers to people of Latin-derived languages. “Latino” is often used by community-based initiatives to reflect an actual connection to the community (Vasquez, 2004). According to the Pew Hispanic Center in a 2006 survey, “48% of Latino adults generally describe themselves by their country of origin first; 26% generally use the terms Latino or Hispanic first; and 24% generally call themselves American on first reference (Passel and Taylor, 2009).” A 2008 Pew Hispanic Center survey found that 36% of respondents prefer the term “Hispanic,” 21% prefer the term “Latino” and the rest have no preference (Passel and Taylor, 2009). The U.S. Census Bureau bases its information about Latinos and Hispanics on anyone self-reporting as Hispanic. In 2010, the U.S. Census form collected data regarding Hispanic origin in a new format, and in greater detail (US Census Bureau, 2010). Now that data from the census is available, health care providers have more information available to them that differentiates self-identification based on country of origin. Between 2000 and 2006, Latinos accounted for half of the population growth in the United States (US Census Bureau, 2009). The growth rate of Latinos is more than 3 times that of the total U.S. population of 1% (US Census Bureau, 2005). Health care professionals are taking greater notice of this population as a group. An example of this increased awareness is the establishment of cultural competence guidelines by the Association of Schools and Colleges of Optometry (ASCO) for schools and healthcare organizations (Association of Schools and Colleges of Optometry, 2008).

In urban community health centers, health professionals often encounter specific ethnic groups that depend on them for comprehensive medical care. Two community health centers in Boston are The Dimock Center and the Martha Eliot Health Center (MEHC), serving the Boston communities of Roxbury and Jamaica Plain, MA, respectively. The percentage of Latino patients at the health centers has been approximately 40% at Dimock and 85% at MEHC. In their respective zip codes, there were 5,856 and 9,025 Latinos, both approximately 25% of the total population of each zip code (US Census Bureau, 2005). With such a significant Latino population at these health centers specifically and in the nation generally, it is helpful to learn more about specific ocular tendencies of the Latino subgroups. Greater knowledge of prevalent ocular and systemic conditions in these populations may also help primary care providers to have greater awareness of when a patient would need referral for eye care.

Methods

This study is a clinic-based, retrospective, cross-sectional study designed to estimate the prevalence of eye disease in a specific population: a predominantly Dominican population, 40 years and older seeking eye care at MEHC and The Dimock Center in the Boston area. Institutional Review Board/Ethics committee approval to conduct this study was obtained from the New England College of Optometry, Boston Children's Hospital, and Beth Israel Deaconess Medical Center.

Charts of patients who had visited the Eye Clinics in either health center for a comprehensive eye exam between August 15, 2003 and August 15, 2005 were randomly selected and assessed for eligibility based on age (>40 years old) and Latino descent. The charts were originally selected by searching random birthdates of patients who would be older than 40 years in the computer database. The patients’ charts were requested if they were listed as Spanish-speaking in the demographics, and if they had been seen during our specific date range for a complete eye exam. All charts that met the inclusion/exclusion criteria were requested. Of the 410 charts pulled, 301 were eligible for this study. The remaining 109 charts of the 410 were mostly excluded.
due to missing information in the chart or no record of country of origin.

The following information was collected from each eligible chart: date of birth, country of origin, gender, preferred language, systemic health (specifically the diagnosis of Type II diabetes mellitus and hypertension), and diagnosis of any ocular disease including: diabetic retinopathy, type and grade of lens opacities (cataract), open angle glaucoma, age-related macular degeneration (AMD), presence of dry eye, meibomian oil gland dysfunction in the eyelids, pingueculae and pterygia (callous-like growths over the conjunctiva or cornea). Prevalence of a particular disease was calculated as the proportion of individuals with that disease among all the individuals in that stratum. A 95% confidence interval was constructed for the estimated prevalence.

Results

Of the 301 charts reviewed at the two health centers, 158 were reviewed from Martha Eliot Health Center, and 143 were reviewed from The Dimock Center. The distribution of gender (Figure 1) showed 74% (223/301) of patients were female. The mean age was 55.07 years old. Approximately one-third (32.2%) were between ages 40 and 50 years old, 38.5% were between 50 and 60 years old, and 29.2% were 60 years old or greater.

Nearly two-thirds (62.1%) of patients studied were of Dominican origin, and 22.6% were of Puerto Rican descent. The remaining 15.3% patients were from Central or South American countries, such as Colombia, Nicaragua, Honduras, Chile, Venezuela, and Peru. Of the total, 98.3% (296/301) indicated Spanish as their preferred language.

Diabetes was commonly encountered, with 30.2% (91/301) of all patients having a diagnosis of Type II diabetes mellitus [95% C.I. (25.0%, 35.4%)]. Among the 91 patients, 20 (21.98%) had diabetic retinopathy. The overall proportion of diabetic retinopathy among all patients was 6.6% (20/301) [95% C.I. (3.8%, 9.5%)]. The criteria for definite diabetes was the documentation of Type II Diabetes in the medical record’s problem plan list, a history of lab work done for Hemoglobin A1c and glucose levels, and documented treatment with insulin, medication, or diet. It was noted whether or not a patient had had their Hemoglobin A1c measured within a year prior to the date of their eye exam. A majority, 82.3% and 64.3% of the patients at Martha Eliot Health Center and at The Dimock Center respectively, had updated laboratory testing (Table 1, following page). A large percentage had evidence of Grade 1 cataracts (61.8%) while 19% were diagnosed with Grade 2 cataracts. A diagnosis of open-angle glaucoma...
was in 4.32% (13/301) of patient charts, and 15.3% of all patients were considered glaucoma suspects. Only one patient was diagnosed with age-related macular degeneration (AMD).

Nine patients did not have recorded data for hypertension, meibomian gland dysfunction, or dry eye syndrome. Among the remaining 292 patients, 113 patients (38.70%) had hypertension, 119 patients (40.75%) had meibomian gland dysfunction, and 62 patients (21.23%) had dry eye syndrome. Overall, 43.2% patients had pingueculae and 21.3% had pterygia in at least one eye.

As shown in Table 2 and Figure 2 (following page), the prevalence of diabetes, diabetic retinopathy, glaucoma suspect, open angle glaucoma, pingueculae and pterygia (see Table 2 and Figure 2) did not differ significantly across the three nationality groups (Dominican Republic, Puerto Rico and Other, which were Central or South American countries) (all p>0.05). The only significant difference was found in the prevalence of hypertension, which was similar between Dominican and Puerto Rican but significantly lower among the Other group (p=0.006).

**Discussion**

The types of Latino origin represented in our Boston-based study were Dominican (62.1%), Puerto Rican (22.6%), and Central or South American (15.3%). The concentration of a mostly Dominican and Puerto Rican patient population in our study is likely a reflection of the health centers’ locations in an area heavily populated by Dominicans and Puerto Ricans. Knowing the types of Latino subgroups in the health center patient population can help interprofessional providers in knowing what kind of systemic and ocular conditions to anticipate.

One condition that is associated with higher risk for Latinos is Type II diabetes mellitus (Office of Minority Health, 2012). The overall prevalence of diabetes in the US Latino population is about 20 million, or about 8.2% of all Latino Americans older than 20 years old (National Diabetes Clearinghouse (NDIC), 2011). According to the National Diabetes Clearinghouse, data from the 2007-2009 national surveys have shown that compared with non-Hispanic white adults, the risk of diagnosed diabetes is 66 percent higher among Hispanics/Latinos (NDIC, 2011). Among Hispanics/Latinos compared with non-Hispanic white adults, the risk of diagnosed diabetes was about the same for Cuban Americans and for Central and South Americans, 87 percent higher for Mexican Americans, and 94 percent higher for Puerto Ricans (NDIC, 2011). The National Diabetes Education Program (NDEP) has reported that 13.8% of Puerto Ricans in all age groups have diabetes (National Diabetes Education Program (NDEP), 2011). In our study of patients over age 40, 30.2% of patients had Type II diabetes and 6.6% of all patients had diabetic retinopathy, such that 21.98% of our diabetic patients had retinopathy. Similarly, Emanuelli, Izquierdo and Townsend (2005) found 7.5% prevalence of diabetic retinopathy in their chart review of 9,298 Puerto Rican patients at a hospital-based eye clinic. The Los Angeles Latino Eye Study (LALES) found that out of 6,357 eligible participants of mostly Mexican origin, 1457 (22.9%) had definite diabetes or probable diabetes mellitus. One thousand two hundred sixty-three (1,263) of these participants (19.87% of all eligible participants) had definite diabetes (Varma, Torres, Pena, Klein, Azen,

<table>
<thead>
<tr>
<th>Table 1 Summary of Diabetic Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
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<tr>
<td>----</td>
</tr>
<tr>
<td>Diabetes (all)</td>
</tr>
<tr>
<td>Males with Diabetes</td>
</tr>
<tr>
<td>Females with Diabetes</td>
</tr>
<tr>
<td>Dominicans with Diabetes</td>
</tr>
<tr>
<td>Puerto Ricans with Diabetes</td>
</tr>
<tr>
<td>All Diabetic Retinopathy</td>
</tr>
</tbody>
</table>
Table 2

Prevalence of Systemic and Ocular Disease by Birth Country

<table>
<thead>
<tr>
<th>Birth Country</th>
<th>Diabetes</th>
<th>Hypertension</th>
<th>Cataract</th>
<th>Glaucoma Suspect</th>
<th>Glaucoma</th>
<th>Diabetic Retinopathy</th>
<th>Pingueculae</th>
<th>Pterygium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominican Republic</td>
<td>29.95%</td>
<td>41.11%</td>
<td>59.36%</td>
<td>17.11%</td>
<td>5.88%</td>
<td>7.49%</td>
<td>44.39%</td>
<td>25.13%</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>38.24%</td>
<td>46.27%</td>
<td>64.71%</td>
<td>11.76%</td>
<td>1.47%</td>
<td>7.35%</td>
<td>48.53%</td>
<td>14.71%</td>
</tr>
<tr>
<td>Others</td>
<td>19.57%</td>
<td>17.78%</td>
<td>67.39%</td>
<td>13.04%</td>
<td>2.17%</td>
<td>2.17%</td>
<td>30.43%</td>
<td>15.22%</td>
</tr>
<tr>
<td>All</td>
<td>30.23%</td>
<td>38.70%</td>
<td>61.79%</td>
<td>15.28%</td>
<td>4.32%</td>
<td>6.64%</td>
<td>43.19%</td>
<td>21.26%</td>
</tr>
</tbody>
</table>

Figure 2

Prevalence of Systemic and Ocular Disease by Birth Country

Los Angeles Latino Eye Study Group, 2004). Of these 1263 diabetics, 1217 (96%) had gradable retinal photographs, and 46.9% of the 1217 showed diabetic retinopathy (Varma et al, 2004). Because the LALES was a randomized, population-based study in comparison to our clinic-based, retrospective study, this may explain why the LALES found a higher rate of diabetes and diabetic retinopathy. The presence of diabetic retinopathy (both proliferative and non-proliferative) occurred in 20 of our 91 patients who had Type II diabetes mellitus. Of the 91 diabetic patients in our study, 21 were male and 70 were female. This uneven distribution of gender in our study does not allow for conclusions about gender and relationship to diabetic retinopathy, though it does perhaps reflect the fact that 74% of retrospective charts studied were those of female patients. According to NDEP, 10.8% of women in the US 20 years and older have diabetes, while 11.8% of men 20 years and older have diabetes (NDEP, 2011). Prevent Blindness compiled data from 12 major epidemiological studies and reported population data for ocular conditions for different ethnic groups and applied statistical models to population numbers from the 2010 US Census (Prevent Blindness, 2012a). The Prevent Blindness model
showed a difference between genders with diabetic retinopathy in Latinos 40 years and older (Prevent Blindness, 2012b). The number of Latino women 40 years and older with diabetic retinopathy was reported as 464,679 while 699,552 Latino men 40 years and older were reported to have diabetic retinopathy (Prevent Blindness, 2012b).

Practicing in an interprofessional setting often allows for easier access to the patient’s entire medical record, such as keeping track of patient compliance with diabetic care, including lab test results. In the process of reviewing charts, it was noted whether a patient had had routine labs performed within the past year of their eye exam, including Hemoglobin A1c for diabetes, as a sign that the patient had been in contact with their physician in the past year. At the Martha Eliot Health Center, 130 out of 158 (82.3%) charts were up to date with Hemoglobin A1c testing. At The Dimock Center, 92 out of 143 (64.3%) charts were up to date. This information could be used for improving quality assurance measures at each health center. Since the survey study was conducted, both health centers have instituted data programs that automatically recall diabetic patients for their yearly diabetic exams. This has allowed for better quality of care in a low-income population with a high no-show rate.

Cataracts were a significant finding in this sample patient population. In our study, 84% of the patients greater than 60 years old had at least grade 1 lens opacities on a 0-4 scale, with 4 being worst. Of the 61.8% of patients with at least Grade 1 cataracts, 57.5% had nuclear sclerosis (diffuse central cataracts), followed by 13.3% with cortical (peripheral) opacities, and 4.32% with posterior subcapsular (circumscribed central) changes. Of the 19% of patients who had Grade 2 (early operable) cataracts or more, nuclear sclerotic cataracts were more common (16.94%) than cortical cataracts (4.30%) and posterior subcapsular cataracts (1.66%). The three categories of nuclear sclerosis, cortical, and posterior subcapsular were not exclusive of each other. In the Proyecto VER study of Mexican participants in Arizona 40 years old and older, 2.8% of 4774 participants were reported to have visually-significant cataracts (Broman, Hafiz, Munoz, Rodriguez, Snyder, Klein and West, 2005). Emanuelli et al (2005) reported a prevalence of lens opacities in 22.1% of the charts surveyed of their Puerto Rican patients. Similarly to our study, Emanuelli’s chart survey found more nuclear cataracts (67.1%) than cortical cataracts (23.5%) (Emanuelli et al, 2005). The LALES study reported a prevalence of 20% for lens opacities of any kind in their study for participants of mostly Mexican origin (Varma and Torres, 2004). There was a higher incidence of nuclear than cortical opacities in the LALES study, but there was a greater progression of cortical opacities than nuclear opacities, and incidence and progression of posterior subcapsular cataracts were low (Varma, Richter, Torres, Foong, Choudhury, Azen, 2010).

Several studies have been done to learn more about associations of cataract with amounts of exposure to ultraviolet (UV) radiation (Sasaki, Hawakami, Ono, Jonasson, Shui et al, 2003) (Sasaki, Jonasson, Shui, et al, 2002) (Johnson, Minassian, Franken, 1989). The Beaver Dam Eye Study found an association between high levels of UV-B and higher incidence of cortical cataracts in men (Cruickshanks, Klein BE, Klein R, 1992). A study of Chesapeake Bay watermen found an association between ultraviolet B exposure and the formation of cataracts (Taylor, West, Rosenthal, Muñoz, Newland, Abbey and Emmett, 1988). The Pathologies Oculaire Lieés à l’Âge (POLA) study in the French Mediterranean studied individuals who mainly had outdoor occupations, and found that those with high exposure to ambient solar radiation had a 2.5 fold higher risk of developing cortical and mixed cataract, but found no significant association between ambient solar light and the development of nuclear sclerotic or posterior subcapsular cataracts (Delcourt, Carriere, Ponton-Sanchez, Lacroux, Covacho and Papoz, 2000). The reason for higher prevalence of cataracts in our patient sample compared to larger studies is one that needs to be further studied for factors such as gender, exposure to ultraviolet light, occupation, and sunglass protection.

While there was a 15.3% prevalence of suspicion of glaucoma in our study, the prevalence of diagnosed open-angle glaucoma in this chart review was 4.32% (13/301). The LALES group found a prevalence of 4.74% for open angle glaucoma in its larger population-based patient sample of mainly Mexican patients (Varma, Ying-Lai, Francis, Nguyen, Deneen, Wilson and Azen, 2004). While our study is retrospective and clinic-based, the similarity of these results in a mainly Caribbean-based Latino patient sample can be built on for further study into the various subcultures of the Latino population. Another result potentially related to the clinic-based nature of our study was that...
only one patient in the chart review had a diagnosis of AMD of any type. The LALES study reported that the prevalence of early AMD increased with age from 6.2% in those 40 to 49 years old to 29.7% in those 80 years or older (P<0.0001) (Varma, Fraser-Bell, Tan, Klein, Azen, 2004). Only 57% of the LALES participants who had early or late AMD reported ever visiting an eye care provider, and only 21% had done so in the last year (Varma, 2004). The LALES study was a predominantly Mexican patient population living in Los Angeles. The low prevalence of diagnosed AMD in our chart review of predominantly Puerto Ricans and Dominicans raises the question of whether the difference is largely due to the self-selective nature of our patient sample that has already sought eye care, or may be affected by possible differences between a mostly Mexican patient population versus a mainly Caribbean patient population. Emmanuelli et al (2005) reported a prevalence of 2.1% with AMD in a chart review of 9,298 Puerto Rican patients. Proyecto VER, studying Latinos in Arizona, found that although early macular changes were very common in their patient sample, the prevalence of late AMD was low at 0.5% (Munoz, Klein and Klein, 2000).

An ocular condition that had a higher prevalence in our sample was dry eye, which was recorded as a diagnosis in 21.23% of the charts reviewed. The Salisbury Eye Study reported a prevalence of dry eye in 15% of their Australian patients. A follow up study from the Beaver Dam Eye Study cohort in Wisconsin reports 14.4% of patients having dry eye (Moss, Klein and Klein, 2000). Only recently have targeted studies been done on the prevalence of dry eye in Latinos. Hom and DeLand (2005) reported that 43.6% of 463 Latinos from Southern California reported symptoms of dryness in a survey study (Hom, DeLand, 2005). Age was a significant predictor because as age increased, the severity of the dryness increased (Gayton, 2009). In general, women and elderly patients are known to be more likely to have dry eye issues (Gayton, 2009)(Moss, 2000)(Moss, 2004). Schaumberg, Sullivan, Buring, and Dana (2003) reported in a prevalence survey of US women, that Latino and Asian women were more likely to report more severe dry eye symptoms than Caucasian women. They also found that women with higher levels of education were less likely to report dry eye symptoms (Schaumberg et al, 2003). Our health center population is generally less likely to be educated, and a significantly higher percentage—74% (222/301, 94% CI (69%, 79%))—of the patients in our study were female, as seen in Figure 1 (p. 3). The higher number of women in the study may explain the 21.23% prevalence of dry eye found.

Also relating to the surface of the eye, 43.2% of our study’s patients had pingueculae and 21.3% had pterygia in at least one eye. Proyecto VER’s study of a Mexican population found an overall prevalence of 16% for pterygia (West and Munoz, 2009). The Blue Mountain Eye Study in Australia found a prevalence of 7.3% of pterygia and 69.5% of pingueculae (Panchapakesan, Hou rihan and Mitchell, 1998). Several studies have reported that there is an association between increased risk of pterygium and increase in ultraviolet radiation and exposure to sunlight (Moran and Hollows, 1984). A study of more than 100,000 Australian aboriginals showed a positive correlation between pterygium and ultraviolet radiation (Panchapakesan et al, 1998). Another study found that people with outdoor occupations were 4-11 times more likely to have pterygia than those working indoors (Mackenzie, Hirst, Battistuta and Green, 1992). While not all of our patients had outdoor occupations, Puerto Rico and the Dominican Republic are located near the equator. The “pterygium belt” which refers to a higher incidence of pterygia anywhere within 37 degrees latitude of the equator, includes both Puerto Rico and the Dominican Republic since they are both approximately at 18 degrees latitude (Ang, Chua and Tan, 2007) (“Latitude of Dominican Republic,” 2013) (“Latitude of Puerto Rico,” 2013). Since most of our patient sample was Dominican or Puerto Rican, their exposure to higher amounts of UVB radiation by their location could be a factor in the high prevalence of pingueculae and pterygia in our study. Other factors could be climate change, genetics, and lifestyle behaviors (Ang et al, 2007).

It is important to note some potential limitations of this study. While the results accurately describe the patients presenting for care at the two community-based eye care clinics, the results may not be generalized to other populations comprised of different ethnic groups and/or from different geographic regions. It should also be noted that because Puerto Ricans are American citizens, issues of immigration are not a factor in studying socioeconomic trends of their eye care. As this study was conducted in a clinic-based setting, it may not be reflective of population-based prevalence. The retrospective nature of the study was such that the patient sample self-selected for eye exams and thus had
access to health care. Thus, we were unable to assess if those living in the community who did not seek eye care had a higher prevalence of certain ocular conditions. The data presented, however, help describe the characteristics of individuals who are seeking eye care services in a community-based setting and potentially provide valuable long-term planning information.

Conclusions

Since there is such diversity within the designation of Latino ethnicity, it is difficult to make general conclusions about ocular patterns to the general category. However, as a result of our survey, it is evident that several issues should be further investigated, including: access to care for adult male Latinos, primary care quality measures for updated lab work for diabetics (and interprofessional coordination with other health care providers), patient education about the effect of sun exposure on the eyes, and further study on dry eye in Latinos.

As different ethnic groups can have ocular characteristics distinct from each other, it is important to understand these differences in order to optimize eye care to various patient populations. These cross-sectional data help the involved community health centers to better understand and address the needs of our adult Latino patients, and adds to knowledge about subsets of Latino groups and their eye conditions. With greater understanding of various socioeconomic, cultural, and environmental factors for our Latino patients, eye care professionals can improve patient education, community outreach, and initiate further research.

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