Prevalence of symptoms of ocular surface disease in patients of ophthalmic practices

Manuel Garza-León¹, Everardo Hernández-Quintela², Héctor G. Cámara-Castillo³, Paola de la Parra-Collin⁴, Paola Covarrubias-Espinosa⁵, Valeria Sánchez-Huerta², Alejandro del Castillo-Ruiz⁶, Fernando Rodríguez-Sixtos⁷, Jorge Pacheco-Patrón⁸, Juan Carlos Ochoa-Tabares⁹, Karina Soto-Ortiz¹⁰ and Karen Hernández-Olguin¹¹ on behalf of the Mexican Group of Research in Visual Sciences

¹Department of Clinical Sciences, Division de of Health Sciences, Universidad de Monterrey, Monterrey, N.L.; ²Department of Cornea and Refractive Surgery, Hospital Dr. Luis Sánchez Bulnes, Asociación para Evitar la Ceguera en México, I.A.P., Ciudad de México; ³Clínica de Mérida, Mérida, Yuc.; ⁴Cornea and Ocular Surface Clinic, Ophthalmology Department, Instituto Nacional de Rehabilitación, Ciudad de México; ⁵Hospital Aranda de la Parra, León, Gto.; ⁶Clínica Oftalmológica del Castillo S.C, Puebla, Pue.; ⁷Ocuclinic, Irapuato, Gto.; ⁸Hospital Ángeles, Chihuahua, Chih., and Hospital San José, Querétaro, Qro.; ⁹Servicios Optométricos y Ópticos SA de CV, Clínica Santa Lucía, Guadalajara, Jal.; ¹⁰Oftalmología Médica y Quirúrgica, Aguascalientes, Ags.; ¹¹Instituto Mexicano del Seguro Social, Unidad Médica de Alta Especialidad No. 76, Hospital Mexicano-Americano, Nuevo Laredo, Tamps. Mexico

Abstract

Objective: To determine the prevalence of symptoms of ocular surface disease (OSDI) surface disease and its relationship with associated risk factors in patients of ophthalmic practices using OSDI questionnaire. **Method:** A cross-sectional survey was conducted Between September and December 2014 to assess the prevalence and risk factors for OSDI. **Results:** The OSDI average value was 40.46 ± 23.62 points, with 86.4% of patients (1967) having a OSDI score higher than 12 points. Women had OSDI symptoms more frequently than men (odds ratio: 1.17; 95% confidence interval: 1.08-1.28) and higher OSDI score (42.12 ± 24.03 vs. 38.01 ± 22.81 points). Patients without disease were younger than the patients with severe disease (45.30 ± 18.32 vs. 50.62 ± 18.86). **Conclusions:** Ophthalmological patients have a prevalence of 80.4% of OSDI. Female and older age was associated with ocular surface disease.

KEY WORDS: Ocular surface disease. Ocular surface disease questionnaire. Dry eye. Risk factors. Ophthalmic patients.

Introduction

Dry eye is one of the most common conditions and a frequent cause for ophthalmologic consultation¹. It is a multifactorial disease of the ocular surface that affects the lacrimal film causing its instability, which results in symptoms of ocular discomfort, visual disturbances and potential harm to external ocular structures².

The prevalence of this condition has been widely studied with quite variable results, from 5% to more than 70% in people older than 50 years^{1,3-13}; the results

vary according to the definition used, the diagnostic methods and the studied population¹.

The Ocular Surface Disease Index (OSDI) questionnaire is a widely used method in dry eye and ocular surface disease epidemiological studies, since it evaluates with 12 questions not only the symptoms associated with this condition, but also the impact on the surveyed subjects quality of life. The results of the OSDI survey can have values between 0 and 100 points and, according to the published guidelines on the OSDI results, patients can be divided in those with a normal ocular surface (0 to 12 points), mild ocular surface disease (13 to 22 points), moderate disease

Correspondence:

Manuel Garza-León
Avda. Hidalgo, 2425 Poniente
Col. Obisado
C.P. 64060, Monterrey, N.L., México
E-mail: manuel.garza@udem.edu

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Table 1. Demographic data

	Patients n = 2,270 (100%)	Without disease n = 303 (13.3%)	Mild disease n = 308 (13.6%)	Moderate disease n = 305 (13.4%)	Severe disease n = 1,354 (59.6%)
Age $\pm$ SD (95%CI)	50 $\pm$ 17.68	45.30 $\pm$ 18.32 (43.14-47.45)	45.15 $\pm$ 19.08 (42.79-47.49)	48.15 $\pm$ 18.78 (46.17-50.13)	50.62 $\pm$ 18.86 (49.59-51.65)
Males, n (%)	922 (40.6)	146 (15.8)	125 (13.6)	135 (14.6)	516 (56)
Females, n (%)	1348 (59.4)	157 (11.6)	183 (13.6)	170 (12.6)	838 (62.2)

95% CI: 95% confidence interval; SD: standard deviation.

(23 to 32 points) and severe disease (33 to 100 points)¹⁴. For the performance of our study, we used the OSDI questionnaire in a Spanish-validated version¹⁵.

To our knowledge, in Mexico there is no published information on the prevalence of ocular surface disease symptoms in patients attending ophthalmology outpatient consultation and, with this being a public health problem¹⁶, having information on the subject is indispensable in our country.

The purpose is to know the prevalence of ocular surface disease symptoms in patients attending ophthalmology outpatient clinics for the first time in our country, as well as to know the relationship between the symptoms and the age and gender of patients attending institutional and private outpatient clinics.

Method

A survey was carried out between September and December 2014 in public and private ophthalmology high specialty centers by doctors who are members of the Mexican Group of Research in Visual Sciences from 19 of the 32 States of the Mexican Republic. The Spanish-translated and validated OSDI questionnaire was used¹⁵ in patients who attended an ophthalmology clinic for the first time, to be autonomously answered prior to entering the office. In case the patient had any doubt, it was directly solved by the specialist physician.

Patients older than 18 years, of either gender, who voluntarily agreed to participate in the study were consecutively included. Patients with any signs and/or symptoms of ocular surface active infection, eyelid structural or functional alterations, including facial palsy sequels, or any mental disturbance that would compromise the questionnaire comprehension, were excluded.

The capture of data was carried out via Internet by means of a site that was specifically created for that purpose. In addition to the OSDI questionnaire, the

following data were collected: patient ID, date the questionnaire was filled, date of birth, gender, place of referral (institutional or private practice), name of the physician and additional comments.

Statistical analysis was carried out with the statistical program R (R Core Central, 2015) to analyze the results, and with the Stan software (Stan development team, 2016. RStan: R-to-Stan interface, Version 2.9.0. <http://mc-stan.org>) for the beta Bayesian regression model.

According to previous studies in our population (data not published), our hypothesis is that the prevalence of ocular surface disease symptoms is higher than 50%.

Results

Out of 2270 participants, 1348 (59.8%) were females and 922 (40.2%) were males, with an average age of 50 $\pm$ 17.68 years (range: 18-97). Females had an average age of 50.98 $\pm$ 17.82 years, and males, 48.56 $\pm$ 17.37 years; the age difference was not statistically significant ($p = 0.154$). Demographic characteristics are presented in table 1. Approximately 75% of patients answered all questions¹², 9% answered 11 and 5% answered 10; minimal answered questions were 5 in 1.5% of questionnaires.

Average value of the OSDI questionnaire result was 40.46 $\pm$ 23.62 units. Ocular surface disease symptoms were present in 1967 participants (86.4%).

Patients without symptoms were younger than the rest (Table 1), with the difference being significant between patients without or with mild symptoms and those with severe symptoms. With regard to gender, females had higher OSDI questionnaire values than males ($p = 0.001$), with 41.12 $\pm$ 24.03 vs. 38.01 $\pm$ 22.81, respectively, and, in addition, showed more severe symptoms than males (Table 1).

Table 2 shows risk factors effect estimates (through the Beta regression model). Females are prone to score higher OSDI values than males (odds ratio [OR]:

Table 2. Estimated effects with risk factors relative risk

Factor	RR	95% CI
Female	1.17	1.08-1.28
Age	1.32	1.21-1.43
<i>Physician's specialty (vs. anterior segment)</i>		
Ocular inflammatory diseases	0.44	0.34-0.57
Retina	0.82	0.67-0.98
Cornea	1.01	0.90-1.14
Glaucoma	1.05	0.90-1.23

95% CI: 95% confidence interval; RR: relative risk.

1.17; 95% confidence interval [CI]: 1.08-1.28). Older patients are prone to score higher OSDI values (RR: 1.32; 95% CI: 1.21-1.43). The patients of specialists in ocular inflammatory diseases and retina tended to score lower OSDI values than those who were referred by anterior segment specialist physicians (RR: 0.44; 95% CI: 0.34-0.57 and RR: 0.82; 95% CI: 0.67-0.98, respectively).

The prevalence of ocular surface disease symptoms by age-decades is presented in table 3. The highest OSDI questionnaire result was in patients aged from 91 to 100 years, followed by those with 81 to 90 years and those with 71 to 80 years. Although severe symptoms were predominant in all life decades, the highest frequency of severe disease was found from the sixth decade of life on, with exception of the 91 to 100-year decade, a group where the number of patients was very small, which is why the frequency of severe disease was not so high even when the OSDI questionnaire result was the highest among all age groups.

Patients were referred by physicians with different high specialty training, almost half (1073; 47.3%), by cornea specialist physicians, followed by 493 (21.7%), by anterior segment specialists, 326 (14.4%), by glaucoma specialists, 290 (12.8%), by retina specialists and 88 (3.9%), by ocular inflammatory diseases specialists. The OSDI values by specialty are shown in table 4.

The assessed patients came both from public institutions and private practices (81.4% of patients came from private practices). When assessing whether the patient referring source had an effect on the prevalence of ocular surface disease by means of the chi-square test, no association was found between the patient referring source and the frequency of ocular surface disease ($p = 0.493$).

Discussion

The prevalence of dry eye in the general population has great variation, which ranges from 7.8% to 57.5%¹⁷⁻²² depending on the dry eye definition and the diagnostic tests performed; however, when only symptoms are taken into account, the prevalence of dry eye symptoms can be as high as 93.2%, as reported by Bukhari et al.³, who studied 251 companions of patients attending ophthalmology appointments in Jeddah, Saudi Arabia. In our study, the prevalence of ocular surface disease symptoms was calculated in ophthalmologic patients; there are few studies assessing patients attending ophthalmology^{23,24} or optometry appointments^{25,26}. In our study, a prevalence of symptoms of 86.4% was found, which is much higher than in other similar studies, such as the one conducted by Hikichi et al.²³, who report it in 17% of adults attending ophthalmology appointments at 8 centers of Japan; however, all patients with dry eye symptoms (89 out of 2127) were excluded in their study, the questionnaire used was different and, in addition, the dry eye diagnosis was made with clinical tests and, according to reports by different authors, there is no important correlation between dry eye symptoms and signs²⁷⁻³⁰. Similar results were found by Sahai and Malik²⁴ when assessing 500 patients attending ophthalmology appointments in Jaipur, India, using the same questionnaire as Hikichi et al.²³ together with clinical tests such as in vivo staining with lissamine green and fluorescein, Schirmer's test and tear film break up time, with a prevalence of 18.4% been reported; however, 55.6% referred blurry vision, which is one of the symptoms assessed in the OSDI questionnaire, which confirms the difficulty to compare these studies with the one conducted by us. Albietsz²⁴ assessed 1584 patients attending an optometry appointment for the first time in Queensland, Australia, and, using the McMonnies questionnaire, in addition to in vivo staining with fluorescein and rose Bengal and tear film break up time measurement, he found a dry eye prevalence of 10.8%, which is a value lower than that reported by Doughty et al.²⁶, who assessed the prevalence of dry eye using a 13-item questionnaire (The Canada Dry Eye Epidemiology Study [CANDEES]) in 9 Canadian provinces, and 28.7% of participants answered positively to the question of whether they had dry eye symptoms.

OSDI questionnaire scores were higher in females than in males, with a statistically significant difference (38.01 ± 22.81 vs. 42.12 ± 24.03 , respectively), owing

Table 3. OSDI questionnaire results by age in decades

Age range, years	n	OSDI value	Without disease n (%)	Mild disease n (%)	Moderate disease n (%)	Severe disease n (%)
18 to 30	370	35.93 ± 2.69	61 (16.5)	64 (17.3)	42 (11.4)	203 (54.9)
31 to 40	380	35.74 ± 1.26	65 (17.1)	67 (17.6)	57 (15)	191 (50.3)
41 to 50	399	40.10 ± 1.23	54 (13.5)	55 (13.8)	49 (12.3)	241 (60.4)
51 to 60	449	44.29 ± 1.15	48 (10.7)	51 (11.4)	62 (13.8)	288 (64.1)
61 to 70	336	41.67 ± 1.33	44 (13.1)	37 (11%)	47 (14)	208 (61.9)
71 to 80	243	44.40 ± 1.55	25 (10.3)	25 (10.3)	38 (15.6)	155 (63.8)
81 to 90	91	48.40 ± 2.50	6 (6.6)	8 (8.8)	10 (11)	67 (73.6)
91 to 100	2	54.36 ± 16.5	0 (0)	1 (50)	0 (0)	1 (50)

Table 4. OSDI score value by referring physician specialty

Specialty	n	Average ± SD	95% CI
Cornea	1,073	41.79 ± 23.33	40.39-43.19
Anterior segment	493	41.31 ± 23.45	39.23-43.38
Glaucoma	326	42.06 ± 24.64	39.38-44.75
Retina	290	39.30 ± 22.82	36.66-41.94
Inflammatory ocular diseases	88	25.45 ± 20.25	21.16-29.74

95% CI: 95% confidence interval; SD: standard deviation.

to the fact that both the prevalence of ocular surface disease symptoms was higher in females (88 vs. 84.9%) and females had severe symptoms more often than males (61.5 vs. 55.3%), which is similar to findings in most studies on dry eye, where females are observed to be affected more frequently than males^{1,4,28,31-33}. In our study, in addition to the influence of gender-related changes, the fact that females were older than males might also have an influence and, both in our study and others^{4,25,26,31,34}, age has a directly proportional relationship with ocular surface disease.

Patients who were referred by physicians highly specialized in retina and ocular inflammatory diseases had the lowest OSDI values; this might be due to the fact that, although some authors have found a higher prevalence of dry eye and Meibomian gland dysfunction in diabetic patients³⁵⁻³⁷, who are the most common population with retinal disease in Mexico, Fuerst et al.³⁷ found that the longer the time of evolution with diabetes, the lesser the presence of symptoms, in addition to the fact that the number of patients was the second lowest, only above the patients referred by physicians specialized in ocular inflammatory diseases. As regards patients of ocular inflammatory diseases specialist physicians, although many of the conditions associated with these have an elevated

prevalence of dry eye³⁸⁻⁴¹, the use of steroids produces an important decrease in ocular surface disease-associated symptoms⁴²⁻⁴⁶.

In conclusion, our study found a very high prevalence of ocular surface disease in patients attending ophthalmology appointments in Mexico, with the female gender and increased age being the most important risk factors.

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