Original Article

Survey on the Knowledge, Attitudes, and Practice Patterns of Ophthalmologists in the Philippines on the Diagnosis and Management of Dry Eye Disease

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ABSTRACT

Objective: To determine the knowledge, attitudes, and practice patterns of ophthalmologists practicing in the Philippines on the diagnosis and management of dry eye disease through a survey using an online questionnaire.

Methods: A simple online survey was designed to determine the knowledge of ophthalmologists practicing in the Philippines on the definition, symptoms, diagnostics, as well as their management of dry eye disease. Respondents also provided information regarding setting and characteristic of practice, years of practice, field of practice, and number of new dry eye patients weekly.

Results: A total of 148 ophthalmologists responded to the survey with a 16% response rate. Most believed dry eye disease was associated with symptoms of ocular discomfort (99%), tear deficiency (98%), and tear film instability (97%). Symptoms believed to be associated with dry eye were dryness (97%), burning sensation (94%), foreign body sensation (93%), and discomfort/pain (93%). Most ophthalmologists diagnosed dry eye based on patient symptoms (99%), tear break-up time (93%), and fluorescein staining (91%). Very few tested for tear osmolarity to diagnose dry eye (6%). Only few used dry eye questionnaires (27%) and lissamine staining (32%). The most valuable tests included tear break-up time (92%), fluorescein staining (88%), Schirmer test (85%), and meibomian gland evaluation (83%). Treatments most commonly used were artificial tear supplements (100%), lid hygiene (94%),

environmental modification (92%), and work and lifestyle modification (88%). Artificial tear supplements were the most valuable treatment (100%), followed by lid hygiene (89%) then environmental modification (85%). The most common first-line medications were carboxymethylcellulose (89%), propylene glycol (85%), and hypromellose (83%). Very few ophthalmologists classified dry eye by type (19%) and by severity (35%), but 80% tailored their treatment to the severity of the dry eye.

Conclusion: Dry eye disease is a common yet frequently underrecognized clinical condition whose etiology and management challenge clinicians and researchers alike. This study showed that ophthalmologists practicing in the Philippines who answered the survey lacked awareness on the new definition of dry eye disease, the newer diagnostic tests, and therapeutics available for diagnosing and managing dry eye disease.

Keywords: Dry eye disease, survey, knowledge, attitudes, practice patterns, Philippines, ophthalmologists

Dry eye is one of the most frequently encountered ocular morbidities. It is a growing public health problem and one of the most common conditions seen by eye care practitioners.[1] Dry eye has recently been defined by the 2007 International Dry Eye Workshop (DEWS) as a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance, and tear film instability with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface.[2]

Epidemiologic studies show wide differences in prevalence. Studies conducted by the Epidemiology Subcommittee of the 2007 DEWS showed that the prevalence of dry eye ranges between 5% and 30% in people aged more than 50 years. It is more commonly diagnosed in women.[3,4]

The 2005 Gallup Survey of dry eye sufferers showed that 61% of them experienced symptoms on a daily basis, including 40% who encountered symptoms several times a day. Although symptoms were not sight-threatening, they became progressively troublesome and increasingly affected patients' quality of life as the disease progressed or increased in severity. Pain and irritative symptoms decreased vitality and energy, ocular health, general health, well-being, physical and social functioning.[5]

Despite increasing understanding of the pathogenic factors involved in dry eye disease (DED), there has been a lack of consensus on diagnostic criteria, classification of disease states, and the aims and interpretation of specific diagnostic tests. With this, there is a need for standardization of disease terminology and diagnostic tests in order to improve the usefulness of epidemiological and clinical investigation of this important ocular disorder.[6]

Several web-based questionnaires have been conducted to assess knowledge, attitudes, and practice patterns on dry eye disease of ophthalmologists and optometrists around the world. These showed that the interest of ophthalmologists on dry eye was rather limited, and that continuing education is an invaluable tool for practitioners to increase self-confidence and improve the clinical practice on DED.[7,8]

This study provides a general picture of how DED is diagnosed and managed by ophthalmologists in the Philippines and indicates if there is a need for more educational activities to be conducted to improve the standard of care of DED.

This study aimed to determine the knowledge, attitudes, and practice patterns of ophthalmologists practicing in the Philippines on the diagnosis and management of DED through a survey using a self-administered online questionnaire. Specifically, the investigators determined the knowledge of local ophthalmologists on the current definition of DED, how local ophthalmologists diagnose and manage DED, and the attitudes of local ophthalmologists towards the diagnosis and treatment of DED.

MATERIALS AND METHODS

Participants

An online call for participation was considered appropriate given the online delivery of the survey. Target participants were members of the Philippine Academy of Ophthalmology (PAO). Members-in-training, inactive, and retired members of the PAO were excluded. A link (http://www.surveytool.com/s/SA45BECB20) to the survey page was emailed 3 times to all members through the official mailing list

last January-February 2013. Responses were collected over a 2-month period. Informed consent was obtained from all participants in the study. Results of all completed questionnaires remained confidential.

Survey Design

A simple, user-friendly, anonymous, online survey was designed using a free internet-based site providing survey tools. The survey consisted of 18 questions (Appendix 1). The first question served as the consent to join the survey and to use the information gathered for the study. The major aspects investigated were (1) knowledge on the definition and symptoms of DED; (2) attitude towards the value of available tests to diagnose and available treatments for DED; and the (3) practice patterns in diagnosing and managing DED. Additional questions on the respondent's age, gender, membership classification and the setting, characteristic, field and length of their clinical practice, and the number of new dry eye patients seen per week. No personal details or any identifiers were included in the questionnaire.

In order to assess knowledge on DED, the survey contained separate comprehensive lists on the definition of dry eye as well as associated symptoms. Next, in order to assess attitude towards the value of available tests for diagnosing and treatments for managing DED, respondents selected from 2 separate comprehensive lists of top tests they deemed most valuable in diagnosing DED and the top modalities they recommend for treating DED. Lastly, to evaluate practice patterns in the diagnosis and management of DED, participants selected among a list of tests they used for diagnosing DED, which dry eye treatments they recommended for their patients, which most common first-line treatments they used, whether they classified dry eye by type and severity, and if their treatments were tailored to the severity of the DED.

Data Analysis

Statistical analysis of the data was performed using the IBM SPSS software for Windows. Descriptive statistics were used to determine frequency of the definitions of DED, symptoms of DED, tests used to diagnose DED and their value for ophthalmologists, recommended treatments for DED and their value for ophthalmologists, and whether DED was classified by type or severity, and if treatment was tailored according to severity.

RESULTS

Eight hundred ninety-one (891) electronic mails were successfully sent to active members of the PAO. A total of 148 ophthalmologists responded to the survey with a 16% response rate. Table 1 shows a summary of the respondents' characteristics. Age of the respondents ranged from 28–69 years old, with most respondents (43%) in the 36–45 age-bracket. Ninety-eight (98) or 66% of the respondents were male. One hundred thirty-two (132 or 89%) of the respondents were diplomates while 16 (11%) were non-diplomates. Based on their setting and classification of clinical practice, most of the respondents were from private teaching institutions in Metro Manila (34%), followed by independent eye centers in the same city, then private non-teaching institutions in the province (29%). Based on their specialization, 95% were general ophthalmologists. Among the subspecialists, the most number were cornea and external disease specialists (30%), followed by glaucoma (23%) then retina specialists (21%). Based on the number of years of practice, most of the respondents have practiced for less than 5 years (30%) followed by those practicing for 11-15 years (23%) and 6-10 years (22%). Based on the number of dry eye patients seen in a week, most ophthalmologists see 6-10 patients in a week (35%).

Table 1. Respondents' Characteristics

		Number of respondents (N=148)	Percentage
Age	25-35	35	25%
	36-45	60	43%
	46-55	35	25%
	>55	9	7%
Gender	Male	98	66%
	Female	50	34%
Classification	Diplomate	132	87%
	Non-diplomate	16	11%
Setting and classification of practice	Private teaching hospital (Metropolitan)	51	34%
	Private teaching hospital (Provincial)	15	10%
	Private non-teaching hospital (Metropolitan)	38	26%
	Private non-teaching hospital (Provincial)	43	29%
	Public teaching hospital (Metropolitan)	42	28%
	Public teaching hospital (Provincial)	20	14%

		Number of respondents (N=148)	Percentage
	Public non-teaching hospital (Metropolitan)	1	1%
	Public non-teaching hospital (Provincial)	13	9%
	Independent eye clinic/eye center (Metropolitan)	47	32%
	Independent eye clinic/eye center (Provincial)	39	26%
Specialization	General Ophthalmology-Cataract	141	95%
	Cornea-External Disease	44	30%
	Retina	31	24%
	Glaucoma	34	23%
	Plastic/Lacrimal/Orbit	16	11%
	Pedia-Ophtha/Strabismus	12	8%
	Neuro-Ophtha	12	9%
	Refractive Surgery	29	21%
	Uveitis and Ocular Inflammation	24	17%
Years of practice	0-5	42	30%
	6-10	33	24%
	11-15	33	24%
	16-20	15	10%
	21-30	8	6%
	More than 30	8	6%
Number of dry eye patients seen in a week	0-5	43	31%
	6-10	46	33%
	11-15	39	28%
	More than 15	11	8%

Figure 1. Respondents' answers on definition of dry eye disease

Figure 2. Respondents' answers on dry eye symptoms

Figure 3. Respondents' answers on tests for dry eye diagnosis

Figure 4. Respondents' answers on value of tests for diagnosing dry eye

The respondents' knowledge on the definition of DED and its associated symptoms is depicted in Figures 1 and 2, respectively. Most believed that DED is associated with symptoms of ocular discomfort (99%), due to tear deficiency (98%), results in tear film instability (97%), and leads to symptoms of visual disturbance (95%) (Figure 1). Associated symptoms include dryness (97%), burning sensation (94%), foreign body sensation (93%), and discomfort/pain (93%) (Figure 2). Figure 3 shows the dry eye tests used by the respondents for diagnosing dry eye. Most ophthalmologists diagnosed dry eye based on patient symptoms (99%), followed by tear break-up time (TBUT) (93%), and fluorescein staining (91%). Very few tested for tear osmolarity to diagnose dry eye (6%). Only 27% used dry eye questionnaires and 32% used lissamin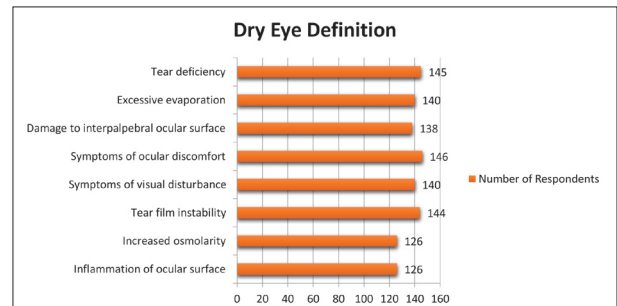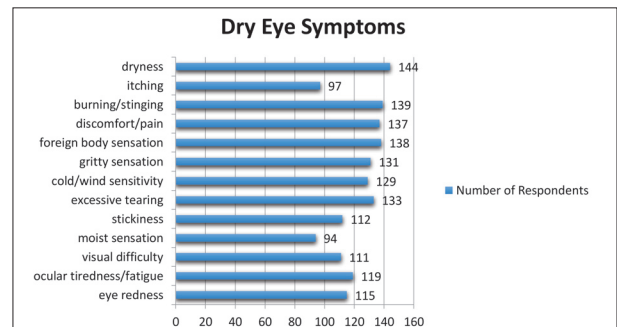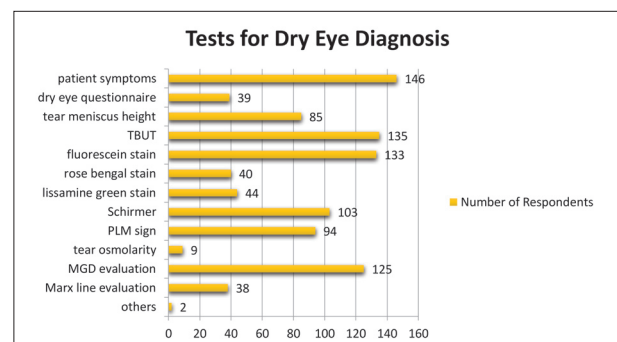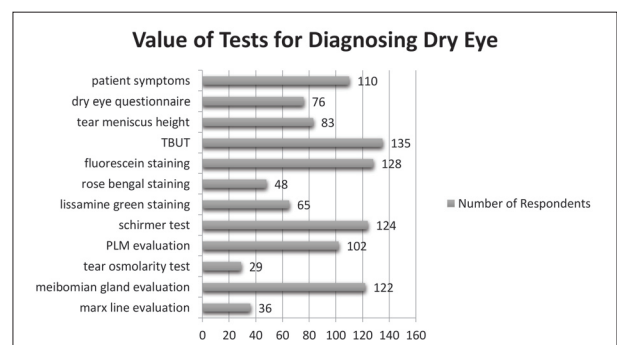e staining. Figure 4 shows the value of the different diagnostic tests for dry eye to the respondents. The most valuable test for ophthalmologists was tear break-up time (92%), followed by fluorescein staining (88%), Schirmer test (85%), and meibomian gland

evaluation (83%). Figure 5 shows the dry eye treatments most commonly prescribed by the respondents. These were artificial tear supplements (100%), lid hygiene (94%), environmental modification (92%), and work and lifestyle modification (88%). Figure 6 shows the value of the therapeutic options available for dry eye. Artificial tear supplements were the most valuable (100%), followed by lid hygiene (89%) then environmental modification (85%), and work and lifestyle modification (82%). Figure 7 shows the common first-line medications recommended by the respondents to their patients. The most commonly prescribed medications were carboxymethylcellulose (89%), propylene glycol (85%), and hypromellose (83%). Only 19% of the respondents classified dry eye by type all the time (Figure 8). Only 35% of ophthalmologists classified dry eye by severity all the time (Figure 9). 80% of the surveyed ophthalmologists tailored their treatment to the severity of the dry eye (Figure 10).
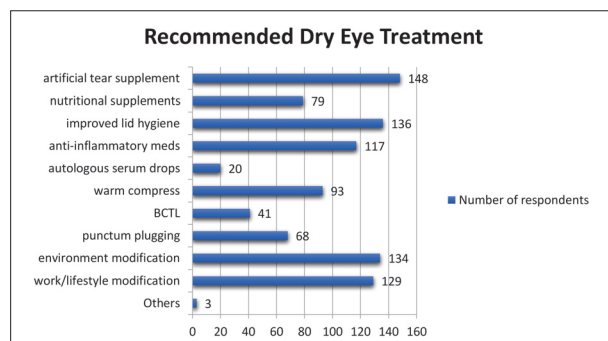

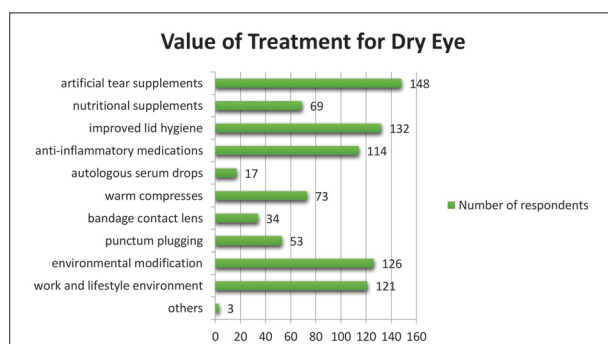**Figure 5.** Respondents' answers on recommended dry eye treatment

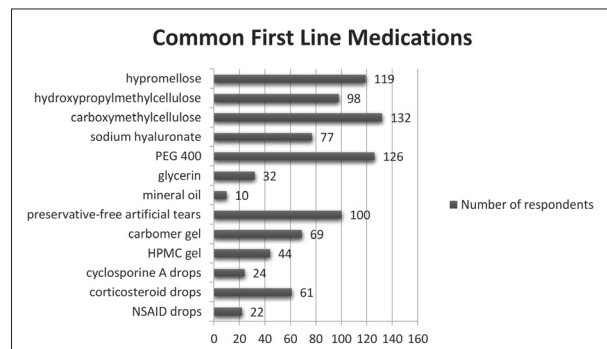**Figure 6.** Respondents' answers on value of treatment for dry eye

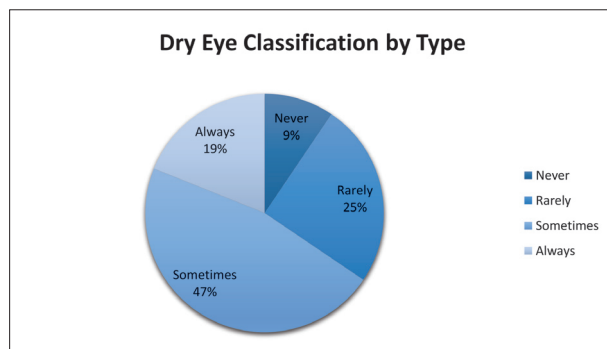**Figure 7.** Respondents' answers on common first-line medications

Figure 8. Respondents' answers on dry eye classification by type
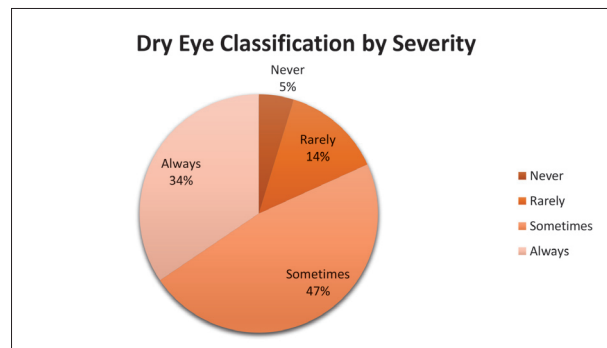

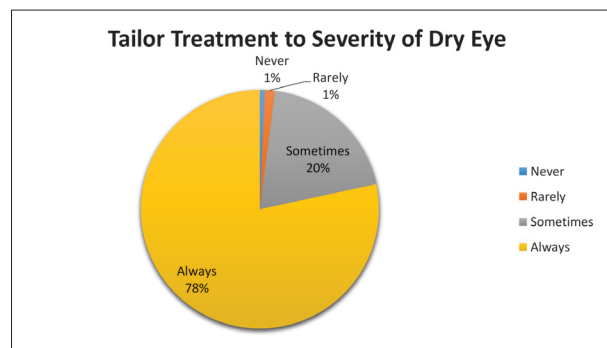**Figure 9.** Respondents' answers on dry eye classification by severity

Figure 10. Respondents' answers on tailoring treatment to severity of dry eye

DISCUSSION

This study aimed to determine the knowledge, attitudes, and practice patterns in the diagnosis and management of DED, of ophthalmologists practicing in the Philippines. An online survey was developed to be able to reach as many ophthalmologists as possible in the entire archipelago.

Only 16% responded to the survey and most respondents came from Metro Manila. However, a good number of respondents came from the provinces and all classifications and settings of clinical practice were represented. The poor response rate may be due to the online approach, wherein many may not have received the invitation or may have ignored it due to their busy schedule or lack of interest. A study employing an online survey on DED in United Kingdom had an overall response rate of 7.4%. The poor response rate was attributed to limited interest on DED among eye professionals.[7] Similarly, an online survey on knowledge and attitudes on DED that was conducted for Spanish optometrists and ophthalmologists yielded only a 4% response rate.[8]

Given the online method of delivery of the survey, it is not surprising that most of the respondents came from Metro Manila since they were most likely the ones with easy internet access. It is not surprising also that most respondents were below 55 years old since these were the ones most likely to be internet-literate.

More diplomates answered the survey. Among the subspecialists, most were external disease and cornea specialists. The latter was expected since they probably were more interested and knew more about the survey topic.

Dry eye was previously defined as "a disorder of the tear film due to tear deficiency or excessive evaporation which causes damage to the interpalpebral ocular surface and is associated with symptoms of ocular discomfort." A more recent definition by the 2007 DEWS included increased osmolarity of the tear film and inflammation of the ocular surface.[3,4] Results of the study showed that majority of the respondents were still using the old definition of tear deficiency (98%) and excessive evaporation (95%). Unawareness of the respondents to the addition of increased osmolarity and inflammation as part of the new definition of dry eye may probably explain why these definitions got the lowest percentages (85%).

Several symptoms are associated with DED. These were listed as options in the survey questionnaire. There is no specific symptom for DED and dry eye patients have different manifestations. Results show that 11 of the 13 symptoms listed were chosen by at least 75% of the respondents as symptoms of dry eye disease. Itching and moist sensation were the least chosen as symptoms of dry eye disease.

There are several diagnostic tests for dry eye. However, no "gold standard" test exists for its diagnosis.[9,13] Vital dye staining with lissamine or fluorescein, Schirmer test, and the Ocular Surface Disease Index are among the standard dry eye diagnostic tools being used.[12] However, it is a commonly-held opinion however that DED can be diagnosed largely on the basis of patient symptoms.[9] This may explain why 99% of the respondents used patient symptoms to diagnose DED. However, patient symptoms only ranked 5th in value among the diagnostic tests for the respondents, probably due to its subjectivity and non-specificity. TBUT and fluorescein staining were also commonly used (91% and 90%, respectively), possibly due to wide availability of fluorescein dye and ease of use. These tests ranked first and second among the most valuable diagnostic tests to the respondents. Only 70% used the Schirmer test probably because it is less readily available and it takes more time to perform the test. It is also more irritating for patients. However, this ranks third in value for the respondents. While dry eye questionnaires (DEQ) are readily available online, only 26% of the respondents used them. This is probably because most respondents already based their diagnosis on patient symptoms and feel they don't need to use DEQs which also ask about patient symptomatology.

It is believed that meibomian gland dysfunction (MGD) may be the most common cause of evaporative dry eye.[13] Significant advances in concepts on MGD and its association with DED has been made by the International Workshop on Meibomian Gland Dysfunction. In this study, MGD evaluation ranked 4th in value for the respondents and was used by 84% of the respondents to help diagnose DED.

Based on the 2007 DEWS report, the measurement of tear osmolarity is the single, most important, objective test in the diagnosis of DED.[12] However, due to the complexity of this test, it got the lowest percentage in the survey (6%). Moreover, 15% of the respondents did not think that increased osmolarity is part of the definition of DED.

For several years, treatment options for DED have been limited to over-the-counter tear substitutes. Hence, all of the respondents prescribed artificial tear substitutes for the treatment of dry eye. They also regarded artificial tear substitutes as the most valuable treatment for dry eye. However, several newer medications with therapeutic properties and other therapeutic measures have been added to the treatment armamentarium of dry eye disease due to recent studies on the pathophysiology of DED. Improved lid hygiene ranked 2nd as the recommended and most valuable treatment prescribed by the respondents. This is consistent with the high percentage of respondents who used and valued MGD evaluation in diagnosing DED.

Environmental factors are said to play a role in the development of DED. Environmental and lifestyle modification ranked 3rd and 4th in the recommended treatment and most valuable treatment for the respondents. The least recommended and least valuable treatment noted was the autologous serum drops. These provide growth factors, fibronectin, immunoglobulins, and are applied in cases of severe dry eye. However, no commercial product is available, nor has the Food and Drug Administration approved this treatment, probably explaining why it ranked the lowest.[14]

Assessment of the severity of DED plays an important role when creating a treatment plan. In the DEWS report, a severity scale has been introduced, accompanied by a set of guidelines for decision making in the treatment of dry eye disease. Despite this, only a few respondents classify their patients by type and by severity, and it is inconsistent that most of them tailor their treatment to the severity of the dry eye, when in fact only a few of them classify their dry eye patients by severity.

CONCLUSION

DED is a common yet frequently under-recognized clinical condition whose etiology and management challenge clinicians and researchers alike. This study shows that ophthalmologists practicing in the Philippines who responded to the survey lacked awareness on the new definition of DED, and the newer diagnostic tests and therapeutics available for diagnosing and managing DED. The limitation of this study includes the low response rate and the inability to sort out the survey forms individually to

be able to compare the responses of cornea specialists versus other subspecialties, to compare the responses of those practicing in the metropolitan versus those in the province, and compare responses of those in teaching versus non-teaching institutions.

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