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Implementation of the dry eye disease framework in Malaysian clinical practice: perspectives from local dry eye experts

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Abstract

Purpose: Diagnosis and management of dry eye disease (DED) differ across clinics due to the variable diagnostic and treatment equipment and the lack of localised guidelines for managing DED. This study aims to understand the current landscape of DED diagnosis and management in the Malaysian healthcare setting, as well as to evaluate the feasibility of implementing a DED framework in local settings.
Study design: A quantitative cross-sectional survey.
Methods: A 12-item multiple-choice questionnaire was administered to 13 local cornea specialists from May to September 2023 via the SurveyMonkey online platform, and the responses were collated and analysed using Microsoft Excel software. The questionnaire comprised of six dimensions: guidelines utilisation for DED diagnosis and management; standardisation for DED diagnosis and management between clinics; administration of validated DED questionnaire to patient; availability of clinical and screening tests in their clinics; treatment availability in their clinics; and follow-up and patient education.

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Results: Most respondents (84.6%) use one or more international guidelines or national guidelines from other countries in their clinical practice. All respondents agreed that DED diagnosis and management should be standardised among ophthalmologists, while 92.3% would consider implementing a standardised DED diagnosis and management algorithm in their practice. More than two-thirds of the respondents (69.2%) do not have the resources for their patients to self-administer DED questionnaires. All respondents have slit-lamp examination, fluorescein tear film breakup time test, and corneal fluorescein staining as screening tools, as well as ocular lubricants, cyclosporine A, and corticosteroids as treatment options in their clinics. Most respondents (92.3%) were able to follow-up with their patients at least every 6 months. Only 38.5% of the respondents were able to allocate time for patient education, with an average of 13 minutes/visit.
Conclusion: This study revealed that most local cornea specialists would consider implementing a standardised DED framework in managing their patients with DED. However, factors impeding its implementation (*e.g.*, diagnostic and treatment equipment availability, cost and clinical workflow differences, and patient loads) in local settings should be identified and tackled to standardise DED management and improve the quality of patient care in Malaysia.

Keywords: diagnosis and treatment, dry eye disease, guidelines, Malaysia

Pelaksanaan kerangka kerja penyakit mata kering dalam amalan klinikal di Malaysia: perspektif daripada pakar mata kering tempatan

Abstrak

Pengenalan: Diagnosis dan pengurusan sindrom mata kering (DED) adalah berbeza antara klinik disebabkan oleh perbezaan peralatan diagnostik dan rawatan serta kekurangan garis panduan tempatan dalam menguruskan DED. Kajian ini bertujuan untuk memahami landskap semasa diagnosis dan pengurusan DED dalam penjagaan kesihatan Malaysia, serta menilai pelaksanaan rangka kerja DED dalam tetapan tempatan.
Bentuk kajian: Kajian kuantitatif keratan rentas.
Kaedah kajian: Soal selidik aneka pilihan 12 soalan telah diedarkan kepada 13 pakar kornea tempatan dari Mei hingga September 2023 melalui platform dalam talian SurveyMonkey, dan respons telah dikumpulkan dan dianalisis menggunakan perisian Microsoft Excel. Soal selidik tersebut terdiri daripada enam dimensi: penggunaan garis panduan dalam diagnosis dan pengurusan DED;

penyeragaman untuk diagnosis dan pengurusan DED antara klinik; pengedaran soal selidik DED yang disahkan kepada pesakit; ketersediaan ujian klinikal dan saringan di klinik mereka; ketersediaan rawatan di klinik mereka; serta susulan dan pendidikan pesakit.
Keputusan kajian: Kebanyakan responden (84.6%) menggunakan satu atau lebih garis panduan antarabangsa atau garis panduan kebangsaan dari negara lain dalam amalan klinikal mereka. Semua responden bersetuju bahawa diagnosis dan pengurusan DED harus diseragamkan dalam kalangan pakar oftalmologi, manakala 92.3% akan mempertimbangkan untuk menggunakan kaedah diagnosis dan algoritma pengurusan DED yang telah diseragamkan dalam amalan mereka. Lebih daripada dua pertiga responden (69.2%) tidak mempunyai sumber untuk pesakit mereka menjawab soal selidik DED dengan sendiri. Semua responden mempunyai pemeriksaan lampu celah, ujian masa pecah filem pemedih mata fluorescein dan pewarnaan fluorescein kornea sebagai alat saringan, serta pelincir okular, siklosporin A dan kortikosteroid sebagai pilihan rawatan di klinik mereka. Kebanyakan responden (92.3%) dapat menjalankan susulan dengan pesakit mereka sekurang-kurangnya setiap enam bulan. Hanya 38.5% responden dapat meluangkan masa untuk pendidikan pesakit, dengan purata 13 minit/lawatan.
Kesimpulan: Kajian ini mendedahkan bahawa kebanyakan pakar kornea tempatan akan mempertimbangkan untuk melaksanakan rangka kerja DED piawai dalam pengurusan pesakit mereka yang mempunyai DED. Walau bagaimanapun, faktor-faktor yang mengekang pelaksanaannya (seperti ketersediaan peralatan diagnostik dan rawatan, perbezaan kos dan aliran kerja klinikal, dan beban pesakit) dalam tetapan tempatan harus dikenalpasti dan ditangani untuk menyeragamkan pengurusan DED dan meningkatkan kualiti penjagaan pesakit di Malaysia.

Kata kekunci: diagnosis dan rawatan, garis panduan, Malaysia, sindrom mata kering

Introduction

Dry eye disease (DED) is a condition that occurs when there are insufficient tears to lubricate the eye.[1] The disease may be categorised according to its pathophysiology to one of the following: evaporative dry eye, aqueous-deficient dry eye, or a mix of these types.[2] Evaporative dry eye is the most prevalent type of dry eye, with meibomian gland dysfunction as its leading cause.[3-7] DED may lead to ocular discomfort, visual disturbance, and fatigue, all of which interfere with quality of life, including aspects of physical, social, and psychosocial functioning, workplace productivity, and daily activities.[8] The prevalence of DED varies widely in Malaysia, ranging from 14.5% to 92.1%.[9-12] According to the Tear Film and Ocular

Surface Society's International Dry Eye Workshop II (TFOS DEWS II) report, being of Asian descent is a consistent risk factor for DED, along with advancing age.[13] The increased use of digital screens has also been linked to DED.[14]

There is considerable variability in the diagnosis and management of DED across clinics, largely due to differences in the availability of diagnostic and treatment equipment, as well as the lack of practical and consistent guidelines for managing DED.[15] Despite several guidelines aimed at improving DED diagnosis and standardising care, including the TFOS DEWS II report, the Asia Dry Eye Society consensus report and the American Academy of Ophthalmology's (AAO) Preferred Practice Pattern®, there remains a gap in the evaluation of the practical applicability and feasibility of these guidelines in local clinical settings.[16-18] Aside from that, the absence of localised guidelines is an obstacle to appropriate DED management.[15] Well-defined guidelines outlining the assessment, diagnosis, and treatment of DED is crucial for standardising DED management in Malaysia and improving the quality of care.

In 2021, a DED framework was introduced to provide general ophthalmologists in Singapore with a standardised guide for managing DED (Fig. 1).[15] The framework helps ophthalmologists in determining the most appropriate treatments based on disease severity and causes, as well as patient's preferences and needs.[15] In this article, we aim to evaluate the feasibility of implementing a similar framework within Malaysian clinical practice. To do so, a survey was conducted among cornea specialists to better understand the current landscape of DED diagnosis and management in local settings.

Methods

We developed a 12-item multiple-choice questionnaire (Appendix, Table 1) based on literature review to understand the current landscape of dry eye diagnosis and management in the Malaysian healthcare setting. The questionnaire comprised 6 dimensions:

i. Guideline utilisation for the diagnosis and management of DED (2 questions).
ii. Standardisation for DED diagnosis and management between clinics (3 questions).
iii. Administration of validated DED questionnaire to patient (1 question).
iv. Clinical and screening tests that are available in their clinics (2 questions).
v. Treatment available in their clinics (1 question).
vi. Follow-up and patient education (3 questions).

The questionnaire was distributed to 13 cornea specialists from May to September 2023 via the SurveyMonkey online platform, and the responses were collated and analysed using Microsoft Excel software.

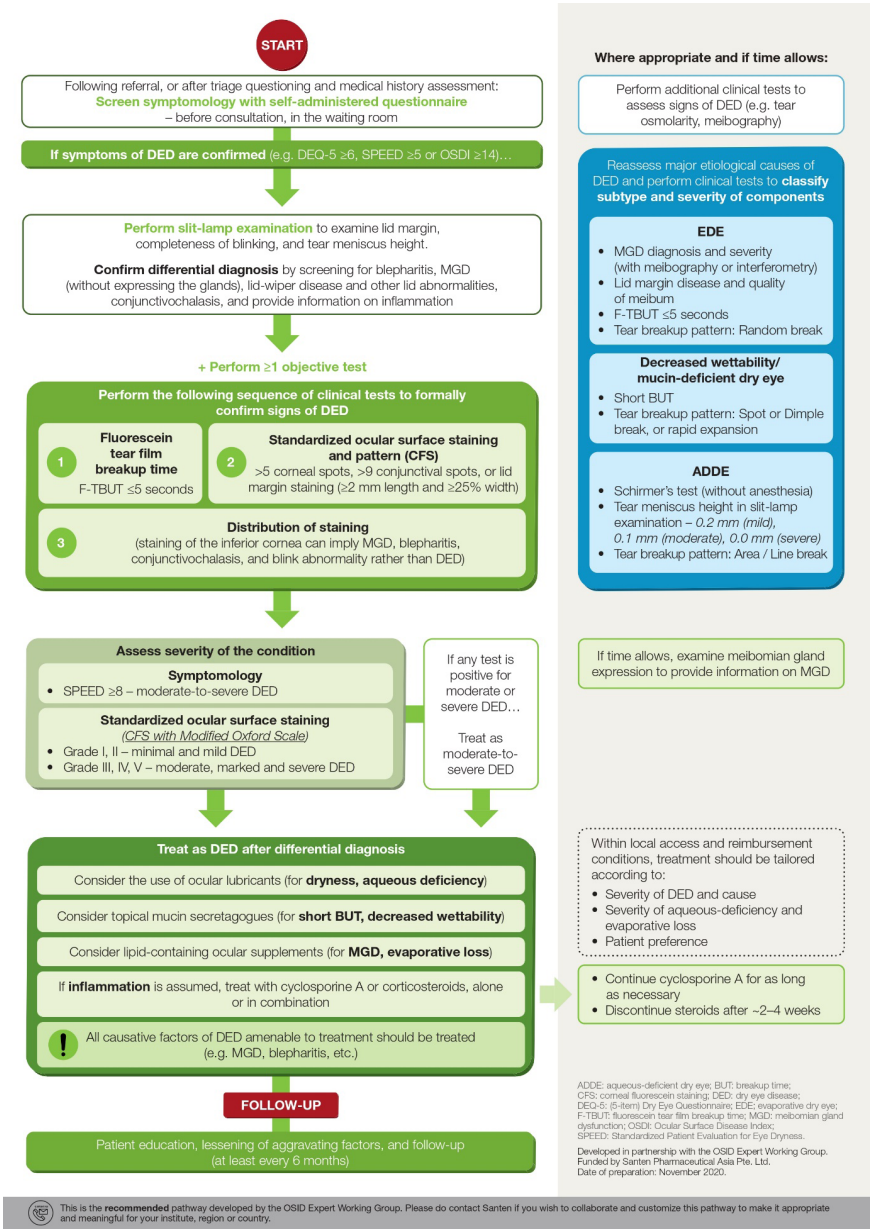

Fig. 1. The DED framework, introduced in Singapore to provide general ophthalmologists with a standardised guide to managing DED. ADDE: aqueous-deficient dry eye; BUT: breakup time; CFS: corneal fluorescein staining; DED: dry eye disease; DEQ-5: 5-item Dry Eye Questionnaire; EDE; evaporative dry eye; F-TBUT: fluorescein tear film breakup time; MGD: meibomian gland dysfunction; OSDI: Ocular Surface Disease Index; SPEED: Standardised Patient Evaluation for Eye Dryness. Reproduced from Tong *et al.*[15] Licensed under CC BY-NC-ND 4.0.

Results

The questionnaire was answered by 13 cornea specialists: 9 from private facilities and 4 from facilities under the Ministry of Education. The results are presented in Table 1.

Table 1. Survey outcomes from a questionnaire distributed to Malaysian cornea experts.

No.	Questions and answer choices	Percentage response
1	Which professional bodies' guideline(s) do you typically refer to in your daily practice for the diagnosis and management of DED (you may select multiple options)? (N = 13)	
	TFOS DEWS II	84.6%
	American Academy of Ophthalmology	15.4%
	Asia Dry Eye Society	15.4%
	National Eye Institute/National Institutes of Health	7.7%
	National Health Service UK	7.7%
	Japan Dry Eye Society	7.7%
	I do not typically refer to guidelines in my daily practice[a]	15.4%
2	Do you find the guideline(s) selected in Question 1 to be practical in your daily practice? (n = 11)	
	Yes	100%
3	Do you think the diagnosis and management of DED require standardisation between clinics? (N = 13)	
	Yes	100%
4	Would you consider implementing a standardised DED diagnosis and management algorithm in your practice? (N = 13)	
	Yes	92.3%
	No[b]	7.7%
5	Would you consider implementing the DED Framework in your practice (Tong *et al.*[15])? (n = 12)	
	Yes	91.7%
	No	8.3%
6	Do you have the resources for your patients to self-administer a questionnaire to analyse DED (*e.g.,* DEQ-5, SPEED or OSDI)? (N = 13)	
	Yes	30.8%
	No	69.2%

No.	Questions and answer choices	Percentage response
7	What are the clinical tests that are available/can be performed at your clinic (you may select multiple options)? (N = 13)	
	Slit-lamp examination	100%
	Fluorescein tear film breakup time	100%
	Corneal fluorescein staining	100%
	Schirmer's test	84.6%
	Tear breakup pattern	84.6%
	Meibography	46.2%
	Interferometry	23.1%
8	Which of the following screenings are you able to perform at your clinic (you may select multiple options)? (N = 13)	
	Blepharitis	100%
	Inflammation	100%
	Meibomian gland dysfunction (without expressing the glands)	92.3%
	Conjunctivochalasis	84.6%
	Meibomian gland expression	69.2%
	Lid-wiper disease and other lid abnormalities	53.8%
9	Which of the following treatments are dispensable at your clinic (you may select multiple options)? (N = 13)	
	Ocular lubricants	100%
	Cyclosporine A	100%
	Corticosteroids	100%
	Punctal plug	92.3%
	Lipid-containing ocular supplements	92.3%
	Topical mucin secretagogues	76.9%
	Thermal treatment for meibomian gland dysfunction	46.2%
	EyePCL (implantable phakic contact lens)	23.1%
	BlephEx™	15.4%
	Intense pulsed light	7.7%
	Plasma jet	7.7%
	Tixel®	7.7%

No.	Questions and answer choices	Percentage response
10	Are you able to follow up with your patients at least every six months? (N = 13)	
	Yes	92.3%
	No	7.7%
11	Is it feasible to allocate time for patient education at every visit to your clinic? (N = 13)	
	Yes	38.5%
	No[c]	61.5%
12	How much time are you able to allocate for patient education at every visit (in minutes)? (n = 5)	
	Range	7-20 minutes
	Mean	13 minutes

Percentages are rounded to one decimal place. DED: dry eye disease; DEQ-5: 5-item Dry Eye Questionnaire; OSDI: Ocular Surface Disease Index; SPEED: Standardised Patient Evaluation for Eye Dryness; TFOS DEWS II: Tear Film and Ocular Surface Society Dry Eye Workshop II.
[a]Skips to Question 3.
[b]Skips to Question 6.
[c]End of survey.

Guidelines utilised for diagnosis and management of DED

Most respondents (84.6%) use one or more international guidelines or national guidelines from other countries (*i.e.* TFOS DEWS II, American Academy of Ophthalmology, National Eye Institute/National Institutes of Health, Asia Dry Eye Society, and Japan Dry Eye Society) in their daily practice.

Need for standardisation of diagnosis and management of DED

All respondents agreed that the diagnosis and management of DED should be standardised between clinics. Additionally, 92.3% of respondents agreed that they would consider implementing a standardised DED diagnosis and management algorithm in their practice; of the proportion of respondents who agreed to consider implementing a standardised DED framework, 91.7% agreed that they would consider implementing the DED Framework by Tong *et al.*[15] in their practice.

Patient self-administration of DED questionnaire

More than half of the respondents (69.2%) do not have the resources for their patients to self-administer a questionnaire to analyse their dry eye symptoms.

Clinical and screening tests available in clinics

All respondents confirmed the availability of slit-lamp examination, fluorescein tear film breakup time test, and corneal fluorescein staining in their respective clinics, and most respondents (84.6%) were also able to perform Schirmer's test and observe for tear breakup pattern. Only a minority of respondents were able to perform meibography (46.2%) and interferometry (23.1%) at their clinics. As to screening, all respondents reported that they were able to screen for blepharitis and inflammation, while most of them were able to screen for meibomian gland dysfunction (without expressing the glands: 92.3%), conjunctivochalasis (84.6%), and meibomian gland expression (69.2%) as well as lid-wiper disease and other lid abnormalities (53.8%) in their clinical practice.

Treatments available in clinics

Ocular lubricants, cyclosporine A, and corticosteroids are available in the clinics of all respondents. Other treatments that improve tear secretion, tear retention, and lubrication also found available in most of the respondents' clinics include punctal plugs (92.3%), lipid-containing ocular supplements (92.3%), and topical mucin secretagogues (76.9%). Less than half of the respondents have thermal treatment (46.2%), implantable phakic contact lens (23.1%), BlephEx (Scope Ophthalmics, London, UK) (15.4%), while a minority of them (7.7%) have intense pulsed light, plasma jet, and Tixel® (Novoxel, Netanya, Israel) in their clinics.

Follow-up and patient education

Almost all respondents (92.3%) reported that they were able to follow up with their patients at least every six months. However, only 38.5% of the respondents found it feasible to allocate time for patient education at every clinic visit. These respondents estimated that they were able to allocate an average of 13 minutes at every visit for patient education (range 7–20 minutes).

Discussion

The survey shed light on the current landscape of DED diagnosis and management in the Malaysian healthcare setting, as well as evaluated the feasibility of implementing a DED framework in local settings. Although most respondents (84.6%) in Malaysia expressed a preference for TFOS DEWS II, the guidelines[18-23] outlined by various professional bodies were found to be practical. Notably, all respondents agreed that standardised guidelines tailored to the Malaysian landscape would help streamline the standard of care received by every patient, with 92.3% considering the implementation of a standardised algorithm in their practice.

However, there are several challenges and unmet needs in the ophthalmology practice, and these factors should be carefully considered when introducing a localised DED framework:

i. The availability of diagnostic tests and treatments at different ophthalmology centres, *i.e.*, public, university, and private centres, ideally, with comparable high-quality DED diagnosis and treatment options offered across ophthalmology centres.
ii. The cost difference of diagnostic procedures and treatments. In general, the framework should help clinicians to get to the root cause of their patients' conditions with minimal consultation and follow-up sessions.
iii. The varying clinical workflows, patient management strategies, and patient volumes across ophthalmology centres highlight the need for a flexible and practical framework that remains relevant and applicable in diverse settings and subspecialties.

The implementation of a national DED framework should serve as a reference for ophthalmologists, supporting the development of more effective diagnostic and management strategies for DED, while raising awareness of DED detection and facilitate patient stratification according to disease severity. Aside from that, the framework should improve chair time, streamline the DED diagnostic process, and tailor treatment to individual patients. More importantly, the framework should help to standardise care and reduce discrepancies between public, university, and private hospitals. It is believed that ophthalmologists in all healthcare settings in Malaysia will benefit significantly from the implementation of a local DED framework to enhance patient management and care delivery.

Acknowledging the challenges and unmet needs in ophthalmology practice, as well the importance of standardising DED management for Malaysian ophthalmologists, these recommendations can serve as a foundational guide, adaptable to specific practice conditions to enhance the quality of patient care.

Diagnosis

The widely implemented questionnaires include the Standard Patient Evaluation of Eye Dryness (SPEED) Questionnaire, Dry Eye Questionnaire-5 (DEQ-5), and Ocular Surface Disease Index (OSDI). Although most respondents (69.2%) lack the resources for patient self-administration of DED questionnaires, allowing patients to complete them in the waiting room can offer a quick overview of symptoms at the beginning of the consultation. Following confirmation of DED symptoms, clinical tests commonly available in all clinics—including slit-lamp examination, fluorescein tear film breakup time, and corneal fluorescein staining—are conducted to confirm DED diagnosis and examine the extent of DED, *e.g.*, a slit-lamp examination of the lid margin, completeness of blinking, and tear meniscus height. In some cases, screening for differential diagnosis might be needed to rule out blepharitis, meibomian gland dysfunction, conjunctivochalasis, lid-wiper disease,

and other lid abnormalities. At least one DED process or clinical test should be abnormal on examination.[15]

Treatment

The goal of DED treatment is to restore ocular surface homeostasis by ending the disease's vicious cycle and providing long-term solutions to prevent symptom reappearance.

Based on the respondents' input, commonly available treatments include ocular lubricants, cyclosporin A, and corticosteroids (all at 100%), followed by punctal plugs and lipid-containing ocular supplements (92.3% each), and topical mucin secretagogues (76.9%). For the initial treatment of DED, the use of ocular lubricants such as hydroxypropyl methylcellulose, polyethylene glycol, hyaluronic acid, and carboxymethylcellulose should be considered. Preservative-free formulations are recommended if frequent ocular lubricant instillation is required (more than five instillations in a day) or the ocular surface epithelium is jeopardised. For patients with a short breakup time and decreased wettability, topical mucin secretagogues, such as diquafosol, should be considered. Meanwhile, ocular lubricants with lipid-containing ocular supplements are recommended for patients with meibomian gland dysfunction and evaporative loss. If inflammation is assumed, patients should be given corticosteroids or cyclosporine A (monotherapy or combination therapy). Corticosteroid eyedrops such as loteprednol, prednisolone acetate, and dexamethasone have a fast onset of action and are often prescribed for short-term use, while cyclosporine A can be administered for as long as necessary. Treatment decisions should made on an individual basis, taking into account disease severity, underlying causes, and the patient's preferences and needs.[15]

Follow-up

Regular follow-up plays an important role in monitoring the condition and medication compliance as well as treatment outcome and side effects.[15,24] The extent and frequency of follow-up evaluation will be determined by the disease severity, therapeutic strategy employed, and the patient's response to treatment. Regardless of severity, a minimum follow-up time of every six months is advised for optimal management of any patient with confirmed DED until the symptoms are under control,[15] achievable by most of the respondents (92.3%). Clinicians should also consider allocating time for patient education at every clinic visit to ensure adequate patient awareness on managing the disease (such as reducing screen time, blinking often, using artificial tears, and using a humidifier) and to remind patients of the importance of continuing treatment as prescribed.[24] However, most respondents (61.5%) reported difficulty allocating time for patient education at every visit, with those who were able to do so spending an average of 13 minutes per session, likely reflecting resource constraints in local ophthalmology settings.

This study represents a useful addition to our understanding of current local practices in DED diagnosis and management as reported by the cornea specialists surveyed. To our best of knowledge, this is the first cross-sectional survey that assesses the current status in managing patients with DED in Malaysia. However, the small sample size for the survey, which did not include cornea specialists from all regions of Malaysia (*i.e.*, Sabah and Sarawak) and representatives from the Ministry of Health, may pose limitations on the generalisability of the results. In the future, more comprehensive research in this area could involve a larger sample size to better represent the country's ophthalmology practices. Exploring barriers to guideline implementation—particularly those related to physician's knowledge and attitudes—may help identify targeted interventions to support adoption of the localised DED framework.[25]

Conclusion

Diagnosis and management practices of DED can vary significantly among ophthalmology clinics in Malaysia. Well-defined guidelines are anticipated to standardise DED management across the country. Although most local cornea specialists surveyed expressed willingness to adopt a standardised DED diagnosis and management algorithm, its feasibility in Malaysian clinical practice requires careful consideration. Challenges such as limited healthcare resources, differences in treatment preferences, and variations in clinic workflows may pose barriers to implementation. Nevertheless, adopting a DED framework is expected to enhance patient care and improve quality of life by streamlining the diagnosis and management of DED nationwide.

Declarations

Competing interests

The three study authors were also respondents of the questionnaire. Otherwise, they declare no competing interests.

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Appendix

Table 1. Questionnaire distributed to Malaysian cornea and external diseases experts to gauge the feasibility of implementing the DED Framework in the local clinical setting

No.	Questions
1	Which professional bodies' guideline(s) do you typically refer to in your daily practice for the diagnosis and management of DED (you may select multiple options)? ☐ TFOS DEWS II ☐ National Eye Institute/National Institutes of Health ☐ American Academy of Ophthalmology ☐ National Health Service UK ☐ Japan Dry Eye Society ☐ MIMS ☐ Others:_____(please state) ☐ I do not typically refer to guidelines in my daily practicea
2	Do you find the guideline(s) selected in Question 1 to be practical in your daily practice? a. Yes b. No
3	Do you think the diagnosis and management of DED require standardisation between clinics? a. Yes b. No
4	Would you consider implementing a standardised DED diagnosis and management algorithm in your practice? a. Yes b. No[b]
5	Would you consider implementing the Dry Eye Disease Framework in your practice (Tong *et al.*[15])? a. Yes b. No
6	Do you have the resources for your patients to self-administer a questionnaire to analyse DED (*e.g.* DEQ-5, SPEED or OSDI)? a. Yes b. No
7	What are the clinical tests that are available/can be performed at your clinic (you may select multiple options)? ☐ Slit-lamp examination ☐ Fluorescein tear film breakup time ☐ Tear breakup pattern ☐ Schirmer's test ☐ Corneal fluorescein staining ☐ Tear osmolarity ☐ Meibography ☐ Interferometry

No.	Questions
8	Which of the following screenings are you able to perform at your clinic (you may select multiple options)? ☐ Blepharitis ☐ Meibomian gland dysfunction (without expressing the glands) ☐ Meibomian gland expression ☐ Lid-wiper disease and other lid abnormalities ☐ Conjunctivochalasis ☐ Inflammation
9	Which of the following treatments are dispensable at your clinic (you may select multiple options)? ☐ Ocular lubricants ☐ Topical mucin secretagogues ☐ Lipid-containing ocular supplements ☐ Cyclosporine A ☐ Corticosteroids ☐ Punctal plug ☐ Thermal treatment for meibomian gland dysfunction ☐ EyePCL ☐ Others: _____(please specify)
10	Are you able to follow up with your patients at least every six months? a. Yes b. No
11	Is it feasible to allocate time for patient education at every visit to your clinic? a. Yes b. No[c]
12	How much time are you able to allocate for patient education at every visit (in minutes)? Draggable scale range: 0 ⟶ 90

DED: dry eye disease; DEQ-5: 5-item Dry Eye Questionnaire; OSDI: Ocular Surface Disease Index; SPEED: Standardised Patient Evaluation for Eye Dryness; TFOS DEWS II: Tear Film and Ocular Surface Society Dry Eye Workshop II.

[a]Skips to Question 3.

[b]Skips to Question 6.

[c]End of survey.