

BMJ Open Patient perception of dry eye disease and treatment: a multinational, cross-sectional, digital survey

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ABSTRACT

Aims Despite the prevalence and burden of dry eye disease (DED), there are potential gaps in diagnosis, professional assessment and treatment engagement. To better understand individuals' perspective of dry eye, a multinational survey was conducted to ask about symptoms, interactions with healthcare professionals (HCPs) and treatments.

Methods Two cohorts were recruited to complete an online survey during 2025 in five countries (France, Germany, Poland, Saudi Arabia and the UK), one representing the general population and the other people with dry eye. No formal diagnosis of DED was required. Data were descriptive, and no inferential statistical analyses were conducted or formal between-country comparisons were made.

Results Survey data were collected from 5152 participants (2580 from the general population and 2572 with dry eye) across the five countries. In the general population, 14–39% (lowest country response to highest country response) reported experiencing regular dry eye. HCP-diagnosed DED was reported by 13–25% of the general population and 39–61% of the population with dry eye. For participants who had visited an HCP about dry eye, most were not under active treatment by a doctor for dry eye (44–76%); ≥50% of initial discussions with HCPs about dry eye were during an appointment for a different reason. For those that had not consulted an HCP, the most frequent reason was that they did not consider their problem severe enough (32–49%).

Conclusions The survey data indicated a gap between self-reported dry eye symptoms and self-reported HCP diagnosis and opportunities for improved awareness and knowledge among people with dry eye. Improvements in patient knowledge and better HCP understanding of patients' needs could optimise outcomes and shift treatment to a personalised, patient-centric approach.

INTRODUCTION

Dry eye disease (DED) is a chronic, often progressive and potentially debilitating condition.¹ It is characterised by persistent discomfort—often described as grittiness or the feeling of having a foreign body in the eye—and unstable vision that affects activities of daily living and, more generally, quality of life. Individuals often self-treat or

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Two large cohorts of participants from five countries were included in the survey, providing a wide breadth of responses.
- ⇒ The questionnaire was comprehensive and collected multiple perceptions of dry eye, with central coding of qualitative responses ensuring that consistency was maintained across countries.
- ⇒ Surveys have inherent weaknesses, such as recall bias or idealised answers. In addition, survey participants were self-selected, with the potential for selection bias and unrepresentative populations.
- ⇒ Statistical analyses of responses were not performed, preventing inter-country comparison or formal assessment of the significance of results.
- ⇒ The protocol intentionally allowed participants to self-define dry eye to capture broad, real-world perceptions of symptoms and treatment; however, the reduced diagnostic specificity introduces the potential for misclassification of dry eye or inclusion of participants who would not be considered to have clinical dry eye disease.

delay seeking professional help, which may result in ineffective alleviation of symptoms or progression to more advanced and potentially serious disease.

Some estimates put the prevalence of DED at over half of the adult population. The highest prevalence has been estimated in studies of populations in South East Asia.² Even the most conservative estimates suggest that at least 10% of people suffer from DED,^{2–5} indicating that it deserves to be considered as a major public health issue. The prevalence of DED increases with age, particularly among women. Global rates of DED appear to be increasing, particularly among younger adults⁴ and in children.⁶ This increase has been, at least in part, attributed to greater screen use^{7 8} and exposure to environmental pollutants.^{9 10}

The pathologies of DED can lead to a vicious cycle of disease in which the underlying inflammation worsens symptoms and

pathologies to cause progressively worse outcomes for the patient.^{11 12} Although DED may initially appear not to be a pathological condition,¹³ epithelial damage, inflammation, nerve damage and changes to the eyelids can lead to conjunctival scarring, corneal ulcers and, in the worst cases, vision loss.^{11 14–16} DED is also associated with conditions such as depression and anxiety,^{17 18} negatively affects quality of life and causes a significant economic burden through loss of work productivity.^{19 20} Fortunately, the most severe ocular outcomes can be avoided by early and effective appropriate treatment.

Despite the prevalence and the potential for outcomes that have a significant impact on individuals' quality of life, it is generally agreed that DED is still underdiagnosed.^{21 22} This has been attributed to a lack of knowledge by the general population and sometimes first-line care providers about dry eye or because most people with dry eye symptoms will initially self-medicate with over-the-counter (OTC) treatments.²³ Understanding patient behaviour, healthcare engagement and unmet needs at a multinational level is therefore essential for ophthalmology, primary care and public health planning.²⁴

To better understand the perspectives of individuals experiencing dry eye, we conducted a multinational survey (Needs Unmet in Dry Eye: Symptoms, Treatment and Severity (NESTS)) of subjects with dry eye symptoms as well as a weighted general population cohort, which aimed to evaluate the burden of dry eye symptoms on daily life and ask questions about treatments and interactions with healthcare professionals (HCPs).

METHODS

This was a two-phase survey of a general population sample cohort (Phase I) and a separately weighted participant cohort with self-reported dry eye (Phase II) in five countries (France, Germany, Poland, Saudi Arabia and the UK). The survey was conducted between February and April 2025 and approved by WCG (Cary, North Carolina, USA) IRB (tracking number 20250595).

Participants in both cohorts were adults (aged 18 years or older), with those in the dry eye cohort self-reporting that they experience symptoms of dry eyes on a regular basis. No formal clinical diagnosis of DED was required. Participants were recruited through invitation via panels using third-party data sources, social media, affiliate networks and mobile app integrations; a double opt-in process provided demographic data for cohort selection.

The cohort in Phase I (general population) was surveyed in February and March 2025, and cohort II (participants with self-reported dry eye) was surveyed in March and April 2025. The survey was carried out using an online questionnaire, with defined responses and, where relevant, the opportunity to provide an additional response. The Phase I cohort was weighted by age, gender and region to reflect the overall general adult population of the country surveyed. The Phase II sample was augmented (using screening questions following the

completion of Phase I) to achieve the target of approximately 500 completed surveys per cohort in each country and was weighted by gender, age and geography to the profile of respondents with self-reported dry eye identified in Phase I; Phase II participants were not individually matched to Phase I participants. The country-level targets were operational quotas, set pragmatically to provide a broadly comparable descriptive base across the five countries and were not derived from a power calculation, as no hypothesis testing was planned. The detailed external benchmark distributions and weighting algorithm were not available to the authors.

The survey consisted of a maximum of 116 core questions (including sub-questions that might or might not be answered depending on responses to a prior question) and five additional background questions. No descriptions were provided to respondents to define 'dry eye', 'dry eye symptoms', 'dry eye problems' or other terms in the survey, enabling participants to report their experiences without prespecified limitations. The surveys were completed online at the respondent's own pace.

The survey was initially developed in English and translated to other languages by a professional native translator for each country, as required. All questionnaires were proofread by a separate translator. The translated survey was tested on a small pilot group of the target cohort to ensure the logic and language flowed naturally. The questionnaire was also verified for functional equivalence (eg, standardising currencies, measurements and date formats). For qualitative and open-ended data, comments were translated into a single language (English) for assessment and centralised coding of responses was used to ensure consistency of comments (eg, to ensure that a positive comment in France was categorised the same way as a positive comment in Germany).

Data are presented as weighted percentages of respondents; no inferential statistical analyses were conducted. Reported sample sizes are unweighted numbers of completed surveys. The authors did not impute or infer unavailable values. Percentages are calculated among respondents to the applicable question; because the questionnaire used conditional branching, denominators differ between questions and the applicable base is stated in the text, tables or figure legends where an outcome relates to a subgroup. The complete English-language questionnaire is provided as online supplemental 1.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

RESULTS

Participant characteristics

Survey data were collected from 5152 participants (2580 in Phase I and 2572 in Phase II) across the five countries (participants in Phase I and II, respectively: UK, 508 and

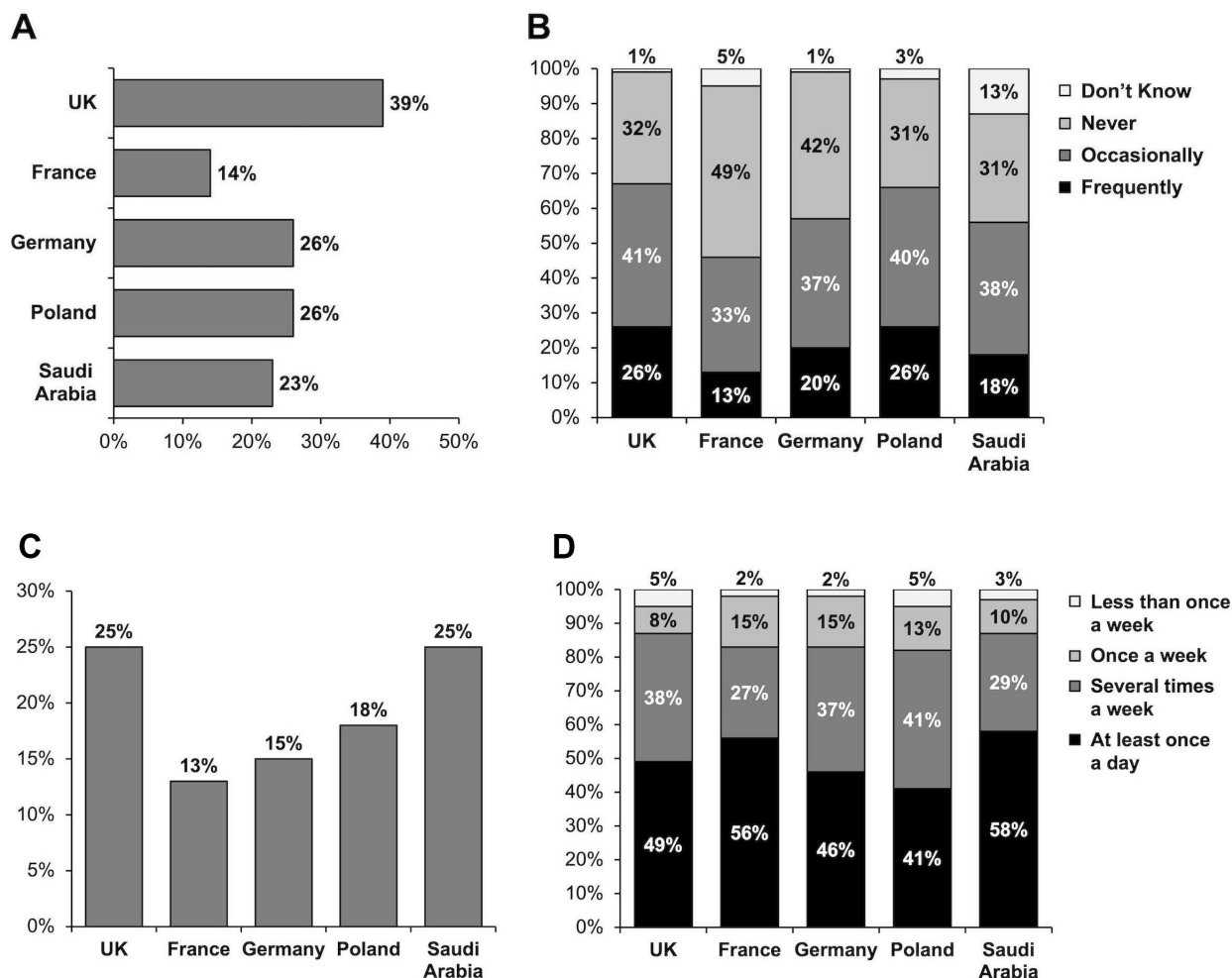


Figure 1 Dry eye symptom rates and frequencies in the general population and the proportion of the general population with a professional dry eye diagnosis and frequency of dry eye symptoms. (A) Proportion of the general population that experiences dry eye on a regular basis. (B) Reported frequency of dry eye symptoms among all adults. (C) The proportion of all adults with HCP-diagnosed dry eye disease. (D) Reported frequency of dry eye symptoms among dry eye sufferers. Phase I population base: UK, n=508; France, n=512; Germany, n=507; Poland, n=534; Saudi Arabia, n=519. Phase II population base: UK, n=506; France, n=513; Germany, n=523; Poland, n=521; Saudi Arabia, n=509. HCP, healthcare professional.

506; France, 512 and 513; Germany, 507 and 523; Poland, 534 and 521 and Saudi Arabia, 519 and 509). In Phases I and II, respectively, 50% and 54% of respondents were female. The mean age of participants by country ranged from 39 to 52 years (online supplemental 2).

Based on responses during Phase I (general population; lowest country response to highest country response), 14% to 39% of respondents (France to UK, respectively) reported experiencing dry eye on a regular basis, with 13% (France) to 26% (both UK and Poland) experiencing dry eye symptoms frequently and an additional 33% (France) to 41% (UK) experiencing them occasionally (figure 1). HCP-diagnosed DED was reported by 13% (France) to 25% (both UK and Saudi Arabia) of the Phase I population and by 39% (Germany) to 61% (France) of the Phase II population; the HCP most commonly making this diagnosis was reported to be an ophthalmologist (14% in Germany to 48% in France). Diagnosis was split

between aqueous (33% in UK to 48% in Saudi Arabia) and evaporative (26% in France to 47% in Saudi Arabia) dry eye, although one-quarter of respondents in Phase II (from 17% in Saudi Arabia to 39% in the UK) did not know which type of DED they had been diagnosed with. Most participants had experienced dry eye symptoms for 1–5 years (58% in France and 71% in Saudi Arabia), with 19% (Saudi Arabia) to 33% (UK) having had symptoms for 6 or more years.

Symptom burden and beliefs

All subsequent results relate to responses in the Phase II population. Dry eye symptoms were reported as severe by 18% (Germany) to 35% (UK) of participants. Participants reporting mild disease ranged from 4% (Poland) to 12% (Saudi Arabia). Very bothersome symptoms were reported by 11% (UK and Poland) to 26% (Saudi Arabia) and 17% (Germany) to 35% (France) reported dry eye

to be not bothersome. Among the symptoms reported as most frequently experienced were dry eye (62–80%; France–Saudi Arabia), tired eyes (58–68%; Saudi Arabia–Poland), watery/teary eyes (29–53%; France–Poland) and scratchy/gritty eyes (17–41%; France–Poland). The most bothersome of these symptoms were dry eye (34–56%; France–Saudi Arabia), tired eyes (22–30%; UK–Poland), watery/teary eyes (10–28%; France–Poland) and scratchy/gritty eyes (6–23%; France–Poland). Among all participants with dry eye, 41–58% (Poland–Saudi Arabia) experienced symptoms daily and a further 27–41% (France–Poland) experienced symptoms several times a week; fewer than 5% of participants reported symptoms less often than once a week ([figure 1](#)). Respondents' experience of flares of dry eye ranged from a mean of 8.8 flares per month in Poland to 20.0 in UK, with 17–28% of respondents (UK–Saudi Arabia) reporting continuous

dry eye. Approximately one-third of those with dry eye (ranging from 30% in the UK to 39% in Saudi Arabia) reported their symptoms had worsened in the previous year, with only 5–18% (Germany–Saudi Arabia) reporting an improvement.

Participants with dry eye attributed their condition to a variety of behavioural, physiological and environmental causes ([table 1](#)), with 13–39% (Saudi Arabia–UK) believing it to be an inevitable part of ageing. Participants reported that screen use (42–65% of respondents; France–Poland) and reading (43–59%; UK and France–Poland), were affected, with work productivity and driving affected by up to 1 in 4 participants. More than 80% of respondents reported having to modify behaviour because of dry eye, primarily by limiting screen time (26–48%; France–Poland) and keeping eye drops easily accessible (35–51%; Germany–Saudi Arabia). The proportion of participants

Table 1 Attributes selected by participants believed to contribute to their dry eye and types of healthcare professionals consulted about dry eye (Phase II cohort)

Major mentions among dry eye sufferers, %	UK n=506	France n=513	Germany n=523	Poland n=521	Saudi Arabia n=509
Attributes believed to contribute to patients' dry eye					
Net behavioural	76	78	73	86	87
Time spent in front of computer screen	50	44	43	58	49
Eye strain	45	55	47	65	54
Make-up	13	12	12	19	18
Contact lenses	11	10	12	9	16
Net physiological	72	66	71	74	66
Natural part of ageing	39	23	28	37	13
Allergies	28	27	26	31	41
Decreased or lack of tear production	14	19	22	20	17
Menopause	11	10	7	7	3
Net environmental	56	53	77	75	74
Dry air/climate	36	31	54	47	50
Heating	27	19	47	39	20
Air conditioning	17	21	24	29	34
Smoke	10	20	20	30	27
Types of healthcare professional consulted for dry eye					
Net eye care professional	57	66	40	65	72
Optician	34	16	28	16	21
Optometrist	19	5	6	6	24
Ophthalmologist	19	56	11	57	52
Pharmacist	17	17	7	19	22
General practitioner	15	20	27	18	19
Nurse/nurse practitioner/PA	4	3	2	3	6
Allergist	4	8	8	8	13
Have not consulted healthcare professional about dry eyes	27	18	28	16	7
Bold entries indicates the NET factor. PA, physician assistant.					

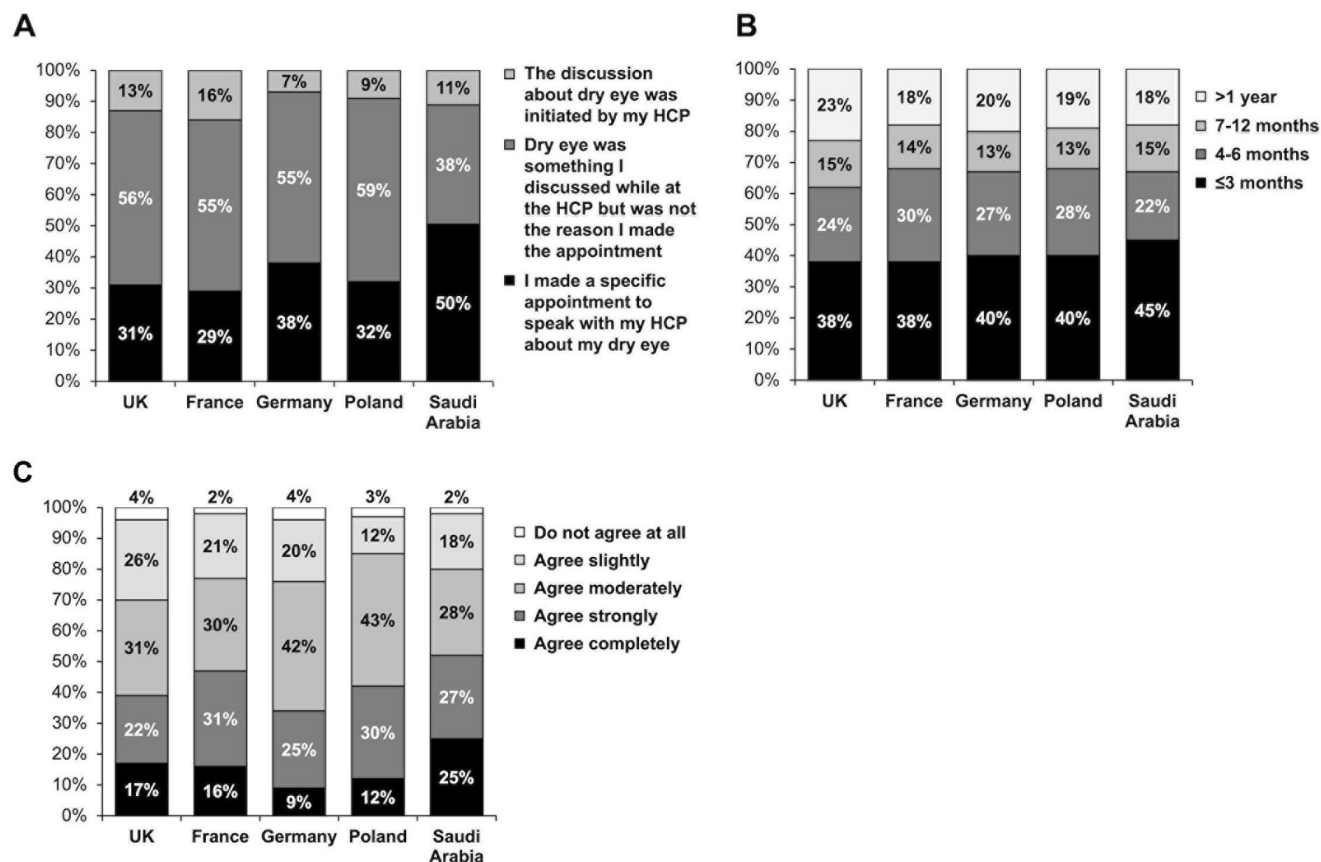


Figure 2 Initial presentation, latency from symptom onset to first visit and opinions on HCP guidance among dry eye sufferers who consulted an HCP. (A) How dry eye was discussed with an HCP at first visit. (B) Time between the onset of symptoms and the initial HCP consultation. (C) Proportion of dry eye sufferers who consulted an HCP that agreed that their HCP provided the best available guidance for managing dry eye symptoms. Population of those who consulted an HCP: UK, n=365; France, n=422; Germany, n=376; Poland, n=433; Saudi Arabia, n=466. HCP, healthcare professional.

who reported visiting their eye doctor or optometrist at least annually (for any eye examination) was highest in Saudi Arabia (72%) and lowest in France (40%).

Healthcare-seeking behaviour and HCP interactions

Most participants with dry eye were aware of the term ‘dry eye disease’ or ‘dry eye syndrome’ (77, 84 and 89% in Germany, Saudi Arabia and Poland), but 37% and 36% of respondents in the UK and France, respectively, were not previously aware of the term. Greater awareness beyond the term itself ranged from 29% to 49% (France–Poland).

Among those who were aware of DED or dry eye syndrome, many learnt about it from an HCP (45–58%; Poland–France) and 23–33% (both UK and France–Saudi Arabia) learnt about it online. Most participants (30–62%; Germany–Saudi Arabia) initially consulted an eyecare professional, rather than a general practitioner or pharmacist, about their dry eye symptoms. Among participants who had discussed dry eye symptoms with an HCP, the majority were visiting the HCP for a different reason (figure 2).

Most participants first talked with an HCP within 6 months of the dry eye symptoms appearing. Prior to first

visiting an HCP, most participants (55–74%; Germany–Poland) had self-treated with non-prescription (OTC) products, with lubricant eye drops the most commonly first-used OTC product by responders from all countries. Behavioural change was also very common (50–69%; France–Saudi Arabia), primarily drinking more water. Participants reported that HCPs were most likely to recommend OTC lubricant eye drops (24–53%; Germany–Poland and Saudi Arabia) and/or increased water intake (20–34%; France and Poland–Saudi Arabia) during the initial consultation.

Among participants who had ever visited an HCP about dry eye, most were not currently undergoing treatment by a doctor for dry eye (UK n=365, 76%; France n=422, 48%; Germany n=376, 61%; Poland n=433, 61%; Saudi Arabia n=466, 44%). There was no consensus among these participants who had consulted an HCP that they had been given the best guidance: 15–30% of respondents (Poland–UK) did not agree or only ‘slightly agreed’ that they had received the best guidance (figure 2). For participants who were under the care of HCPs for dry eye, the majority visited at least two times a year (UK n=88,

Table 2 Treatments used at any time by participants with dry eye (Phase II cohort)

Major mentions among dry eye sufferers, %	UK n=506	France n=513	Germany n=523	Poland n=521	Saudi Arabia n=509
Net non-prescription tears/drops/ointment/gel	72	70	76	87	74
Non-prescription lubricant eye drops	53	37	29	65	45
Non-prescription artificial tears	19	28	36	26	25
Non-prescription allergy drops	16	18	24	24	26
Non-prescription eye ointment or gel	12	11	20	17	16
Non-prescription redness relief drops	9	12	17	27	19
Prescription medication	20	26	15	30	38
Contact lenses designed for dry eye	6	7	8	5	13
Contact lens lubricant or in-eye drops for rewetting lenses	4	6	5	3	10
Surgical procedure to close tear canals (such as punctal plugs or cauterisation)	2	4	5	3	7
MGD thermal heating and pulsation treatment	2	2	3	2	5
None of these	18	13	17	7	8

Bold entries indicates the NET factor.
MGD, meibomian gland dysfunction.

70%; France n=219, 47%; Germany n=145, 72%; Poland n=170, 67%; Saudi Arabia n=270, 84%). For those who responded to why they had not consulted a doctor for their dry eye (UK n=141, France n=91, Germany n=147, Poland n=88, Saudi Arabia n=43), the most frequent reason given was that they did not consider their problem severe enough (UK 43%, France 32%, Germany 35%, Poland 39%, Saudi Arabia 49%). Other reasons included believing it was something they had to live with (11–31%; Saudi Arabia–France), not believing there was anything a doctor could do (4–17%; Saudi Arabia–Germany), satisfaction with OTC options (8–15%; Saudi Arabia–France), being unaware of prescription treatment options (4–20%; France–Saudi Arabia) and because they had consulted with a pharmacist (1–6%; UK–Poland).

Treatment patterns

At least 70% of participants with dry eye had used OTC products at least once, with lubricant eye drops the most popular (table 2). OTC products were also the most common currently-used treatments, with 55–78% (UK–Poland) of participants using non-prescription options, of which lubricant eye drops (20–55%) and artificial tears (8–26%) were the most common at the time of the survey (Germany–Poland and UK–Germany, respectively). Prescription medications were actively being used by 9–29% of participants (Germany–Saudi Arabia). Respondents were not limited to selecting a single response to current treatments.

Contact lenses designed for dry eye had been used by 5–13% of all Phase II participants (Poland–Saudi Arabia). Among habitual contact lens wearers, 34–44% in Europe (UK–Poland) and 70% in Saudi Arabia wore contact lenses designed for dry eye; 58–89% of habitual contact lens users (UK–Saudi Arabia) indicated that dry eye

interfered ‘somewhat’ or ‘very [much so]’ with contact lens wearing. Most respondents had tried other actions to resolve dry eye, with drinking more water (29–46%; France–Saudi Arabia), cleaning eyelids (12–24%; Germany–UK), avoiding smoke (24–41%; UK, France, Germany–Saudi Arabia) and avoiding air conditioning (17–36%; UK–Poland) the most common.

Prescription treatments had been used at any point by 15–38% of respondents (Germany–Saudi Arabia). The most popular reason given for not using prescription therapies is the belief that the dry eye is not serious enough (26–46%; Poland–UK; table 3). Despite this, most participants would be willing to use a prescription medicine (UK, 13% very likely and 47% somewhat likely; France, 20% and 44%; Germany 16% and 49%; Poland 15% and 52%; Saudi Arabia 43% and 46%); 40–60% of respondents would be willing to try new treatments if recommended by a doctor.

The biggest concern with dry eye treatments was the need to use them several times a day (20–28%; France–Poland) and that the perceived effect of each instillation does not last long enough (20–27%; UK–Saudi Arabia) and 7–21% (UK–Saudi Arabia) were concerned that dry eye continued to get worse despite treatment. Symptom relief from OTC eye drops was consistently shorter than expected, with mean hours of relief provided as 3.21–5.89 (Poland–Germany) against an expected 7.46–8.40 hours (France–Germany).

Most participants with dry eye (48–71%; Poland–France) had loyalty to one brand of OTC eye drops. If the preferred brand was unavailable, the most common action was to ask the pharmacist for an alternative recommendation (31–41%; UK–Saudi Arabia); 24–39% (Saudi Arabia–Poland) would buy another brand and 14–18%

Table 3 Reasons for not using prescription treatments for dry eye (Phase II cohort)

Major mentions among dry eye sufferers, %	UK n=506	France n=513	Germany n=523	Poland n=521	Saudi Arabia n=509
Do not think my dry eye is serious enough	46	28	25	26	28
Do not think a prescription would be that different from over-the-counter artificial tears/lubricant eye drops	18	14	20	17	17
Have to make doctor's appointment and see the doctor	17	15	18	24	26
Satisfied with other treatments (artificial tears, etc.)	15	13	18	14	17
Doctor did not bring it up or recommend it	12	17	21	16	20
Do not like to take prescription medication in general	12	16	18	8	12
Concerned about safety/side effects	7	12	15	8	21
Too expensive/not covered by my insurance	7	11	10	8	11
Used in the past, but it was not effective	5	12	9	8	16
Doctor said it was not for me	5	9	9	9	12

(France–Saudi Arabia) would buy a different product from the same brand. Participants reported that HCPs tended to recommend one specific brand of OTC eye drop (58–68%; Poland–France) and 26–55% (France–Saudi Arabia) of doctors provided a sample of the recommended brand. Overall, 25–49% (France–Saudi Arabia) of participants were very satisfied with their OTC eye drop brand and 2–7% were ‘not too/not at all’ satisfied (Saudi Arabia–France).

DISCUSSION

This large, multinational survey of two cohorts—one of a general population and the other with self-reported dry eye—provided a unique breadth of participant feedback on the understanding of perception, diagnosis, burden, effects and treatment of dry eye. Although there have been multiple local and national-level surveys of participants with DED,^{25–31} there have been few multinational surveys.³²

The results from this survey indicate that, in agreement with existing evidence, HCP-diagnosed DED is far lower than the number of people reporting symptoms of dry eye: in the general population cohort, up to ~40% of respondents reported regular symptoms and ≥46% reporting frequent or occasional symptoms. Despite this, the highest proportion of participants with a formal diagnosis in any of the countries surveyed was 25% and the difference between those with a formal diagnosis and experiencing symptoms ranged from a 31 to 48 percentage point difference. Even among the cohort with self-reported dry eye, up to one-third of the participants had not consulted an HCP about their dry eye, with only 40% of the cohort in Germany having consulted an HCP. This gap between self-reported symptoms and self-reported HCP diagnosis is likely to be common and potentially exacerbated by the reasons many respondents gave for not consulting a doctor about their dry eye symptoms, with most selecting negative/dismissive statements (perceived lack of severity, just having to live with the symptoms, not believing there

is anything the doctor can do). In an international survey of individuals with dry eye, fewer than half of those questioned had consulted with any HCPs about their condition³³; crucially, this included not asking for advice from pharmacists, despite many using OTC treatments where interaction with a pharmacist might be expected to occur, offering an opportunity to ask for advice. Furthermore, underdiagnosis has been reported in surveys in other country settings (eg, Japan)²⁶ and estimates of prevalence in the USA indicate that, while 16 million people are estimated to have diagnosed DED, a further 6 million people are believed to suffer from DED without a formal diagnosis.³⁴ From a broader perspective, these findings highlight DED as a healthcare system challenge rather than solely an ophthalmic condition.²⁴

Even among those respondents that had received professional help, there was often a considerable delay in seeking advice. Although the majority of participants in the survey who had visited an HCP for dry eye first discussed dry eye with an HCP within 6 months of the start of symptoms, approximately 20% waited for more than a year. This has the potential for poorer outcomes because a longer delay in time to professional diagnosis from the initial onset of symptoms has been correlated with worse discomfort, pain and impact on quality of life.³⁵ Crucially, dry eye symptoms were not the primary driver for visiting an HCP; the greatest proportion of participants in the survey discussed dry eye with their HCP during an appointment for another reason. Combined with the evidence that some demographic groups, particularly younger individuals and men, have a lower likelihood to seek professional support for dry eye²¹ and the perception among many participants that dry eye is an age-related condition and something they would have to live with, greater awareness among and education for the general public is urgently required to ensure timely diagnosis and appropriate management, to mitigate potential individual burdens and the potential for more serious outcomes with undertreatment.

Approximately half of respondents in the survey experienced symptoms on a daily basis, with more than two-thirds of participants experiencing flares, with most requiring use of products and changes to daily behaviour to alleviate symptoms. Participants in the study reported difficulties with screen use, reading, work productivity and driving, supporting prior studies on the burden of dry eye in which DED sufferers report problems with these activities. Compared with people without DED, such issues are 2.5–3.5 times more common in those with DED.¹³ Almost one-third of people with DED believe that it affects their ability to conduct their usual daily activities, including mobility,³² and that DED has a ‘high impact’ on their quality of life.³⁵ Studies indicate that performance at work and their work productivity is impaired by nearly 30% because of DED and its symptoms.²³ For participants believing that their dry eye was deteriorating rather than improving, their dry eye-associated burden may be exacerbated.

Responses to questions about treatment effects and symptom relief were mixed. Previous studies indicate that treatment satisfaction is reported as the key priority for patients with dry eye,³⁶ with treatment frequency and type of administration (with eye drops being the preferred delivery method) important to patients.³⁶ Respondents in the current study noted specific dissatisfaction with the length of symptom relief from eye drops and the need to use several drops a day. This finding was also reported in another study of OTC dry eye treatments, in which only about one in three were satisfied with the symptom relief provided,²³ however, most patients using OTC treatments in this study reported overall satisfaction with their treatment, potentially indicating low expectations among individuals with dry eye for how effective dry eye medications should be. Additional data also suggest that patients may not be using drops according to recommended timings,³⁷ which may reduce their effectiveness, and many individuals report trying only one therapeutic option, with the most reported single therapy being artificial tear products.³³ This limited therapy experience could be related to a limited involvement of eye care professionals in the treatment decisions of people with dry eye and a lack of knowledge among those with dry eye symptoms of alternative therapeutic approaches.

Even among patients who do receive professional care, variability in clinical approaches to management may affect outcomes³⁸ and management strategies differ across countries.³⁹ Evidence suggests that physicians routinely underestimate the level and effects of pain experienced by patients in all healthcare settings,⁴⁰ and, as well as being more prevalent, symptoms may be worse (and underestimated) among women.⁴¹ Furthermore, healthcare specialists in DED have raised concerns that knowledge of how best to treat DED is ‘insufficient’ among some primary care and eye care providers¹³ and improved education is required.⁴² Such concerns include a perception that despite advances in therapeutic options, treatment regimens have remained the same for ~20 years.⁴³

Notably, up to a quarter of respondents in the current study believed they had not been given the best possible guidance. The hope and intention is that the evidence-based treatment algorithm in DEWS III has the potential to improve clinical management of dry eye for all patients.⁴⁴ Crucially, people with dry eye need support to ensure that treatment decisions are appropriate and effective. In the current study, many had attempted lifestyle modifications, such as increasing water intake, which are unlikely to have a beneficial change to dry eye symptoms based on the current understanding.⁴⁵ Furthermore, the most commonly used treatments remained OTC options, even in those individuals who express dissatisfaction with their current outcomes and report continued worsening of symptoms. The tendency to initially self-manage symptoms and not to raise dry eye symptoms with HCPs as a primary concern highlights the need for broad education and, crucially, awareness among the general public and those most likely to be initially consulted by people with dry eye symptoms is essential.

Strengths of the study include the large sample size in multiple countries with a comprehensive questionnaire providing a broad perspective on dry eye. In addition, the dry eye cohort was weighted to the profile of respondents with self-reported dry eye identified in the general population cohort. The use of central coding of qualitative responses ensured that consistency was maintained across countries. Weaknesses include the self-selection of the study population, which has the potential for sampling error, as well as the self-defined criteria for dry eye which, while enabling collection of a broader range of perceptions, reduced diagnostic specificity. Similarly, there was no confirmation that participants who reported having a diagnosis of DED were accurate and/or equivalent across the study. There was no additional qualitative follow-up to enable greater interrogation into responses and the lack of inferential statistical analysis prevents robust between-country comparisons of responses or understanding of between-country differences. Finally, there are standard limitations of surveys, such as incorrect or inaccurate recall and the potential for bias in answers (such as participants providing idealised responses) that should be considered. Recruitment through digital non-probability panels may also introduce coverage, volunteer, digital-access, selection and panel-conditioning biases; weighting can improve alignment with a demographic profile but cannot remove these biases or establish national representativeness, and the findings should therefore not be extrapolated beyond the five surveyed countries. The reported *n* values are completed surveys and a full recruitment disposition (numbers invited, screened, eligible and excluded) was not available to the authors. Because dry eye was self-defined, without a clinical diagnosis or a validated symptom instrument such as the Ocular Surface Disease Index (OSDI) or Dry Eye Questionnaire (DEQ-5), the difference observed here is between self-reported symptoms and self-reported HCP diagnosis rather than a clinically confirmed prevalence gap.

CONCLUSION

This study adds to the evidence that DED may be routinely underdiagnosed and undertreated with considerable and clinically underrated impact on patients' quality of life. Few individuals with dry eye feel they have a treatment tailored to their needs or understand that effective management of dry eye is possible. Improvements in patient awareness and understanding of dry eye and the multifaceted treatment options available as well as increased appreciation among HCPs of patients' needs, the impact of dry eye on their quality of life and appropriate therapeutic options could optimise outcomes and shift treatment to a more personalised, patient-centric approach.

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Competing interests PAW reports a relationship with Bausch and Lomb Rochester that includes consulting or advisory. EMM, SF and MA report a relationship with Bausch and Lomb Rochester that includes consulting or advisory. RR and EA report a relationship with Bausch and Lomb Rochester that includes employment. SCJ and ML report a relationship with Bausch and Lomb Rochester that includes consulting or advisory.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

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REFERENCES

- Perez VL, Chen W, Craig JP, et al. TFOS DEWS III: Executive Summary. *Am J Ophthalmol* 2026;282:135–45.
- Stapleton F, Alves M, Bunya VY, et al. TFOS DEWS II Epidemiology Report. *Ocul Surf* 2017;15:334–65.
- Papas EB. The global prevalence of dry eye disease: A Bayesian view. *Ophthalmic Physiol Opt* 2021;41:1254–66.
- Magno MS, Hynnekleiv L, Hammond CJ, et al. Are we amid a dry eye epidemic? – The increasing prevalence of dry eye disease in Europe. *Invest Ophthalmol Vis Sci* 2024;65:2855.
- Stapleton F, Argüeso P, Asbell P, et al. TFOS DEWS III: Digest. *Am J Ophthalmol* 2025;279:451–553.
- Hwang YK, Lee TE, You IC, et al. Dry Eye Syndrome in Children during the COVID-19 Pandemic. *Korean J Ophthalmol* 2024;38:441–9.
- Al-Mohtaseb Z, Schachter S, Shen Lee B, et al. The Relationship Between Dry Eye Disease and Digital Screen Use. *Clin Ophthalmol* 2021;15:3811–20.
- Muntz A, Turnbull PR, Kim AD, et al. Extended screen time and dry eye in youth. *Cont Lens Anterior Eye* 2022;45:101541.
- Kim Y, Choi YH, Kim MK, et al. Different adverse effects of air pollutants on dry eye disease: Ozone, PM2.5, and PM10. *Environmental Pollution* 2020;265:115039.
- Alves M, Asbell P, Dogru M, et al. TFOS Lifestyle Report: Impact of environmental conditions on the ocular surface. *Ocul Surf* 2023;29:1–52.
- Rolando M, Merayo-Llodes J. Management Strategies for Evaporative Dry Eye Disease and Future Perspective. *Curr Eye Res* 2022;47:813–23.
- Baudouin C, Messmer EM, Aragona P, et al. Revisiting the vicious circle of dry eye disease: a focus on the pathophysiology of meibomian gland dysfunction. *Br J Ophthalmol* 2016;100:300–6.
- Dunn JD, Karpecki PM, Meske ME, et al. Evolving knowledge of the unmet needs in dry eye disease. *Am J Manag Care* 2021;27:S23–32.
- Messmer EM. The pathophysiology, diagnosis, and treatment of dry eye disease. *Dtsch Arztebl Int* 2015;112:71–81.
- Karpecki PM, Nichols KK, Sheppard JD. Addressing excessive evaporation: an unmet need in dry eye disease. *Am J Manag Care* 2023;29:S239–47.
- Mohamed HB, Abd El-Hamid BN, Fathalla D, et al. Current trends in pharmaceutical treatment of dry eye disease: A review. *Eur J Pharm Sci* 2022;175:106206.
- Tsai CY, Jiesibie ZL, Tung TH. Association between dry eye disease and depression: An umbrella review. *Front Public Health* 2022;10:910608.
- Wan KH, Chen LJ, Young AL. Depression and anxiety in dry eye disease: a systematic review and meta-analysis. *Eye (Lond)* 2016;30:1558–67.
- Yu J, Asche CV, Fairchild CJ. The economic burden of dry eye disease in the United States: a decision tree analysis. *Cornea* 2011;30:379–87.
- McDonald M, Patel DA, Keith MS, et al. Economic and Humanistic Burden of Dry Eye Disease in Europe, North America, and Asia: A Systematic Literature Review. *Ocul Surf* 2016;14:144–67.
- Inomata T, Iwagami M, Nakamura M, et al. Characteristics and Risk Factors Associated With Diagnosed and Undiagnosed Symptomatic Dry Eye Using a Smartphone Application. *JAMA Ophthalmol* 2020;138:58–68.
- Yamanishi R, Uchino M, Kawashima M, et al. Characteristics of Individuals with Dry Eye Symptoms Without Clinical Diagnosis: Analysis of a Web-Based Survey. *J Clin Med* 2019;8:721.
- Nichols KK, Bacharach J, Holland E, et al. Impact of Dry Eye Disease on Work Productivity, and Patients' Satisfaction With Over-the-Counter Dry Eye Treatments. *Invest Ophthalmol Vis Sci* 2016;57:2975–82.
- Ismail MF, Khalafalla I, Qarbote AI. Prevalence of dry eye disease in African populations: a systematic review and meta-analysis. *BMC Ophthalmol* 2025;25:508.
- Benítez-Del-Castillo JM, Burgos-Blasco B. Prevalence of dry eye disease in Spain: A population-based survey (PrevEOS). *Ocul Surf* 2025;36:126–33.
- Shimazaki J, Nomura Y, Numa S, et al. Prospective, Multicenter, Cross-Sectional Survey on Dry Eye Disease in Japan. *Adv Ther* 2020;37:316–28.
- Hossain P, Siffel C, Joseph C, et al. Patient-reported burden of dry eye disease in the UK: a cross-sectional web-based survey. *BMJ Open* 2021;11:e039209.
- Pereira LA, Arantes LB, Persona EL de S, et al. Prevalence of dry eye in Brazil: Home survey reveals differences in urban and rural regions. *Clinics (Sao Paulo)* 2025;80:100578.
- Dana R, Meunier J, Markowitz JT, et al. Patient-Reported Burden of Dry Eye Disease in the United States: Results of an Online Cross-Sectional Survey. *Am J Ophthalmol* 2020;216:7–17.

- 30 Marini MC, Liviero B, Torres RM, *et al.* Epidemiology of dry eye disease in Argentina. *Discov Public Health* 2024;21:59.
- 31 Dossari SK, Alkhars AZ, Albaqshi AA, *et al.* Prevalence of Dry Eye Disease and Its Risk Factors Among the General Population of Saudi Arabia: A Cross-Sectional Survey. *Cureus* 2022;14:e32552.
- 32 Boboridis KG, Messmer EM, Benítez-Del-Castillo J, *et al.* Patient-reported burden and overall impact of dry eye disease across eight European countries: a cross-sectional web-based survey. *BMJ Open* 2023;13:e067007.
- 33 Bilkhu P, Sivardeen Z, Chen C, *et al.* Patient-reported experience of dry eye management: An international multicentre survey. *Cont Lens Anterior Eye* 2022;45:101450.
- 34 Farrand KF, Fridman M, Stillman IÖ, *et al.* Prevalence of Diagnosed Dry Eye Disease in the United States Among Adults Aged 18 Years and Older. *Am J Ophthalmol* 2017;182:90–8.
- 35 Labetoulle M, Rolando M, Baudouin C, *et al.* Patients' perception of DED and its relation with time to diagnosis and quality of life: an international and multilingual survey. *Br J Ophthalmol* 2017;101:1100–5.
- 36 Asbell P, Messmer E, Chan C, *et al.* Defining the needs and preferences of patients with dry eye disease. *BMJ Open Ophthalmol* 2019;4:e000315.
- 37 Uchino M, Yokoi N, Shimazaki J, *et al.* Adherence to Eye Drops Usage in Dry Eye Patients and Reasons for Non-Compliance: A Web-Based Survey. *J Clin Med* 2022;11:367.
- 38 Wolffsohn JS, Semp DA, Dutta D, *et al.* Clinical practice patterns in the management of dry eye disease: A TFOS international survey 2023-24. *Ocul Surf* 2025;36:164–72.
- 39 Wolffsohn JS, Travé Huarte S, Jones L, *et al.* Clinical practice patterns in the management of dry eye disease: A TFOS international survey. *Ocul Surf* 2021;21:78–86.
- 40 Seers T, Derry S, Seers K, *et al.* Professionals underestimate patients' pain: a comprehensive review. *Pain* 2018;159:811–8.
- 41 Schaumberg DA, Uchino M, Christen WG, *et al.* Patient reported differences in dry eye disease between men and women: impact, management, and patient satisfaction. *PLoS One* 2013;8:e76121.
- 42 Cheong N, Ang JH-L, Kaya C, *et al.* Symptomology and Impact of Dry Eye Disease: A Patient and Physician Perspective. *Ophthalmol Ther* 2025;14:1357–68.
- 43 Hantera MM. Trends in Dry Eye Disease Management Worldwide. *Clin Ophthalmol* 2021;15:165–73.
- 44 Jones L, Craig JP, Markoulli M, *et al.* TFOS DEWS III: Management and Therapy. *Am J Ophthalmol* 2025;279:289–386.
- 45 Nguyen L, Magno MS, Utheim TP, *et al.* The relationship between habitual water intake and dry eye disease. *Acta Ophthalmol* 2023;101:65–73.