Dry Eye: How to Ask The Right Questions

A well-designed questionnaire can help in all phases of diagnosis and management of dry eye.

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QUESTIONNAIRES ARE POWERFUL AND economical research tools that give us the ability to analyze large amounts of data. In clinical research, well-designed questionnaires are currently being used to diagnose dry-eye disease and determine the severity of dry-eye symptoms. In this article, we'll discuss how to design a good questionnaire and how to apply those guidelines to diagnosing and treating dry eye.

Questionnaire Design

The questionnaire design process deserves careful attention. It's essential to define the purpose of the instrument (i.e., diagnosis vs. evaluation of treatment). A well-designed questionnaire will be validated for reproducibility and consist of reasonable questions that produce responsive answers. The current dry-eye questionnaires have certain limitations, though.

In survey design, the primary requirement is that the questionnaire be sensitive and specific. Sensitivity refers to the number of cases that are correctly identified as meeting a certain condition. Specificity refers to the number of cases that are correctly identified as not meeting the condition. The aim of a well-designed questionnaire is to maximize the number of true values and minimize the false ones.

The trade-off between false negative and false positive rates can be graphically represented by what's known as a receiver operating characteristic curve. Measuring the area under the curve will reveal the ability of the questionnaire to accurately identify patients with the condition and those without it. The closer the measurement is to 1 (a perfect questionnaire), the better. This number can be interpreted as the proportion of case-control pairs, where a dry-eye case has a higher test score than a control. The ideal questionnaire would highly discriminate between dry-eye cases and controls.

Grading scales are also important. Binary-item questions are straightforward, but, in some cases, questions with multiple possible graded responses are more informative. In order to maintain consistency, a questionnaire should use clear grading scales. The questionnaire must also standardize aspects such as frequency, severity and duration of symptoms. Using anchored analog scales ensures valid and reproducible results.

Instructions for completing a questionnaire should be concise. The language should be simple and direct. The response to one question shouldn't depend on the response to another. Transitions between questions should be smooth. Also, the time of day when patients give their answers is important, since symptoms can worsen throughout the day.

Specifics of Dry Eye

When designing a dry-eye questionnaire, it's essential to be aware of all the facets of the disease. The causes of dry eye are numerous. Dry-eye symptoms can be associated with environmental conditions, aging, lacrimal or meibomian gland dysfunction, menopausal changes, or excessive visual tasking such as computer work. Ocular diseases, such as allergies and infection, and systemic ailments such as Sjögren's, arthritis and lupus can exacerbate symptoms.

Signs and symptoms themselves may vary greatly, and include burning, stinging, watering, blurred vision, redness, grittiness, photophobia and pain. Certain medications also affect dry

Table 1: Dry-Eye Questionnaire Comparison Chart

Key: • Description • Advantages • Disadvantages

1. Dry Eye Quality of Life Questionnaire ***(Pollard S, et al. IOVS 2004;45:E-Abstract 82)***	• 15 questions, scored on a scale of 0 to 6, divided into five categories. • Focuses on patient quality of life • Doesn't address frequency, duration or severity of symptoms
2. McMonnies Dry Eye Index[i]	• The original specific dry eye diagnostic questionnaire • 12 questions, most yes/no • Has a formal grading scheme; tested for psychometrics • Does not grade severity or impact
3. Dry Eye Screening Questionnaire[ii]	• 17-question survey to discover the prevalence dry eye. • Includes questions regarding allergies and contact lenses, as well as a patients' current treatments • Diagnostic tool only • Focuses on frequency, not severity
4. Impact of Dry Eye on Everyday Life (IDEEL)[iii]	• 3 modules: quality of life (27 items), symptom-bother (20 items) and treatment satisfaction (10 items) • Scores on a 0 to 6 scale • Better than generic eye-health questionnaires (i.e., the SF-36 and EQ-5D) at evaluating severity of symptoms • Has not been evaluated against other dry-eye questionnaires
5. Dry Eye Questionnaire 2001 (DEQ)[8]	• Measures the habitual frequency, intensity, and impact of common ocular surface symptoms and asks questions about computer use, medications and allergies • Extensively queries both symptom frequency and intensity • Not yet streamlined to remove less informative questions • Requires considerable data entry
6. Ocular Surface Disease Index (OSDI)[9]	• Developed to quantify the specific impact of dry eye on vision-targeted, health-related quality of life. Includes subscales: ocular discomfort, functioning and environmental triggers • Has only 12 questions and takes only a few minutes • Targeted to assess how much the symptoms of dry eye affect the patient's current (in the last week) health • Responses to items that measure function are limited to the frequency of problems, omitting severity

i. Nichols K, Nichols JJ, Mitchell GL. The Reliability and Validity of McMonnies Dry Eye Index. Cornea 2004;23:4:365-371.
ii. Oden NL, Lillenfeld DE, Lemp MA, et al. Sensitivity and specificity of a screening questionnaire for dry eye. Adv Exp Med Biol 1998;438:807-20.
iii. Rajagopalan K, Abetz L, Mertzanis P, et al. Comparing the discriminative validity of two generic and one disease-specific health-related quality of life measures in a sample of patients with dry eye. Value in Health 2005;8:2:168-74.

eye, such as blood-pressure drugs, antihistamines, decongestants and pain relievers. In one study, the antihistamines loratadine (Claritin, Schering-Plough) and cetirizine (Zyrtec, Pfizer) were shown to induce signs and symptoms associated with ocular dryness, including increased ocular discomfort.[1]

An Evolving Role

Recently, questionnaires have been expanded to study the global picture: how patients interact with their environments; their symptoms; and how symptoms affect their quality of life.

One example of this trend is a study that involved the development and testing of a health-related quality-of-life questionnaire for rhinoconjunctivitis.[2] The design process of this Rhinoconjunctivitis Quality of Life Questionnaire revealed essential guidelines. Some of the elements included were physical and emotional effects, areas of function important to the patient population and scores amenable to statistical analysis. The RQLQ's creators emphasized reproducibility, responsiveness and brevity.

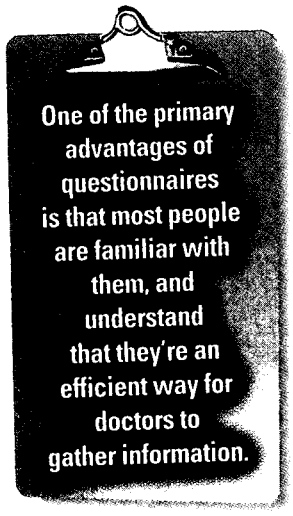
Various other methods have been developed to measure whole-body quality of life. The 36-item short-form (SF-36) was designed to survey health status for use in clinical practice and research, health policy evaluations and general population surveys.[3] The SF-12 was adapted from the SF-36 a few years later[4] as a means of reproducing the physical and mental component summary scales for the general population.

It's important to develop questionnaires that recognize the importance of quality of life. An example of one such questionnaire is the recently developed Allergic Conjunctivitis

Quality of Life Questionnaire.[5] The ACQLQ was used in conjunction with the RQLQ to measure how the addition of topical ocular therapy improved quality of life.[6] Dry-eye signs and symptoms have been shown to correlate with numerous negative effects on daily living, including loss of confidence and frustration with daily activities.[7]

Research has also demonstrated the impact of dry eye on daily ocular activities. In one study, 76 percent of patients indicated that their ability to read was negatively effected by dry eye *(Wilcox KA, et al. IOVS 2003;44:ARVO E-Abstract 2474).*

In one survey, dry-eye patients experienced an average of 184 days of reduced productivity at work, which translated to $5,362 lost annually per patient *(Kozma CM, et al. IOVS 2000;41: ARVO Abstract 4933).*



Existing Questionnaires

As mentioned earlier, a number of dry-eye questionnaires have been studied, but each has limitations.

Some examples of dry-eye surveys include the Dry Eye Investigation Study Group's Dry Eye Questionnaire, which queries both symptom frequency and diurnal intensity, but requires extensive data entry and only considers patients with aqueous-deficient dry eye.[8] Another tool, the Ocular Surface Disease Index, has been shown to be a reliable and valid instrument, but directly assesses only symptom frequency, not severity.[9] The Dry Eye Quality of Life Questionnaire, developed by Ophthalmic Research Associates, is another recently developed questionnaire that, upon further testing, may prove to be valuable. *(Pollard S, et al. IOVS 2004;45: ARVO E-Abstract 82)*

Pros and Cons of Questionnaires

• ***Advantages.*** When compared to interviews, questionnaires are cost-effective. Considering the time needed to ask a patient about symptoms, questionnaires are an economical way to obtain useful information.

Most people are familiar with questionnaires, and understand that they're an efficient way for doctors to gather information.

Another benefit of questionnaires is reduced bias. There are no verbal or visual cues to influence the respondent, and a good questionnaire doesn't have any leading questions.

Questionnaires are more comprehensive than a history, and they can help clinicians remember what to ask.

• ***Disadvantages.*** Generally, questionnaires don't allow for qualified responses. In addition, nearly 90 percent of all communication is visual—a limitation in a written questionnaire. Another potential problem is that some questionnaires include unimportant questions. Also, some patients would rather tell you about their condition in their own words.

Treatment

After a patient has been diagnosed with dry eye, the next step is choosing a treatment. This can be done with the use of a questionnaire in conjunction with clinical testing.

Patients with aqueous tear deficiency can benefit from artificial tear substitutes. Severe dry-eye patients with a significant inflammatory component may benefit more from Restasis (cyclosporin A, Allergan). Using Restasis in conjunction with an artificial tear such as Alcon's Systane has been shown to be a good treatment combination, especially since it often takes up to six months for Restasis to affect dry-eye symptoms.[10] Post-treatment, questionnaires can be used to evaluate the efficacy of therapy.

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