Original Article

Validation of the Arabic version of the Contact Lens Dry-Eye Questionnaire-8 in Palestine

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ABSTRACT

Background: The Tear Film and Ocular Surface Society International Workshop on Contact Lens Discomfort has stated that the Contact Lens Dry Eyes Questionnaire (CLDEQ-8) is the only validated clinical tool for assessing dry eye related to the use of soft contact lenses. Although translations of this questionnaire into various languages have been validated, the translation into Arabic has not been validated. We aimed to translate and validate the Arabic version of the CLDEQ-8 questionnaire in a clinical context among a sample of Arabic-speaking soft contact lens wearers residing in Palestine.

Methods: The CLDEQ-8 was translated into Arabic via a five-stage process: forward translation, translation revision, backward translation, refinement, and prefinal testing. The content validity of the questionnaire was assessed by a panel of 19 experts by using the Content Validity Ratio (CVR) and the Content Validity Index (CVI). After reviewing the pre-test results, the Arabic-CLDEQ-8 was finalized. For clinical validation, a web-based version of the Arabic-CLDEQ-8 was distributed to eligible soft contact lens wearers in Gaza, Palestine. Internal consistency was evaluated using Cronbach's alpha and the Corrected Homogeneity Index.

Results: Thirty-four soft contact lens wearers, with a mean (standard deviation [SD]) age of 23.9 (5.7) years and with a mean (SD) contact lens-wear time was 10.5 (7.5) hours, including 30 (88.2%) women, completed the questionnaires. The mean (SD) score on the Arabic-CLDEQ-8 was 17.00 (6.69) (range: 2–30). Cronbach's alpha, indicating internal consistency, was 0.900, and the corrected homogeneity index exceeded 0.50 for all assessed domains, except for domain 4 (D4). The CVI and CVR were 0.73 and 0.87, respectively. Domains D1a, D1b, D2a, D3a, D3b, and D4 were found to be clear and simple, while domain D2b demonstrated an average level of content validity.

Conclusions: The trans-cultural adaptation of the CLDEQ-8 questionnaire led to the development of a reliable and valid tool for assessing the contact lens comfort among Arabic-speaking soft contact lens wearers. This Arabic-CLDEQ-8 was culturally adapted for Arabic-speaking contact lens wearers living in Palestine; thus, future studies should aim to confirm its validity in other Arabic-speaking regions.

KEYWORDS

questionnaire, contact lens, validity and reliability, translations, cronbach's alpha, homogeneity index, content validity ratio, content validity index

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How to cite this article: Aljarousha M, Alghamdi WA, Isa MZA, Badarudin NE, Nordin FM, Bin Sari MF, Cheriya ENK, Attaallah S, Alhoot MA. Validation of the Arabic version of the Contact Lens Dry-Eye Questionnaire-8 in Palestine. Med Hypothesis Discov Innov Optom. 2024 Fall; 5(3): 93-102. DOI: https://doi.org/10.51329/mehdioptometry203

Received: 06 December 2024; Accepted: 20 January 2025

INTRODUCTION

Soft contact lenses are widely used to correct vision [1]. Comfortable contact lens wear is influenced by several factors, including the type of lens material and the design of the lenses; the duration of wear; lens-care practices; environmental conditions, such as humidity, wind, and temperature; and user characteristics, such as age, sex, occupation, and ocular comorbidities or medications used [2-6]. Contact lens discomfort is characterized by the presence of ocular surface symptoms, with dry-eye sensation being the most common complaint among wearers. This discomfort is often linked to tear film stability, tear volume, the pre-lens lipid layer thickness, and changes in tear composition [7, 8].

Contact lens discomfort is not always linked to visual disturbances or clinical findings [9]. Almost one-quarter of the patients may present only symptoms, without obvious clinical signs, even when some clinical findings, such as meibomian gland dysfunction and shorter tear breakup time, might be indicative of a diagnosis of dry eye [10-13]. Consequently, use of questionnaires to assess symptoms during clinical evaluations of contact lens wearers is essential [13].

The Tear Film and Ocular Surface Society International Workshop on contact lens discomfort states that the Contact Lens Dry Eyes Questionnaire-8 (CLDEQ-8), or its long form, the CLDEQ, is the only validated clinical questionnaire for evaluating soft contact lens-related dry eye [14, 15]. The CLDEQ-8 has been translated into several languages, including Spanish [16], Japanese [17, 18], Turkish [19], Portuguese [20], Chinese [21], French [22], Greek [23], and Italian [24] and these translations have been validated. While this questionnaire has been applied to assess dry-eye syndrome among contact lens wearers in Saudi Arabia [25-27], no translation of the CLDEQ-8 into Arabic has been validated to date.

This study aimed to translate the CLDEQ-8 questionnaire into Arabic and validate it among a sample of Arabic-speaking soft contact lens wearers residing in Palestine.

METHODS

This observational, descriptive prospective study was conducted to translate and validate an Arabic version of the CLDEQ-8 questionnaire among Arabic-speaking soft contact lens wearers living in Gaza, Palestine. The study adhered to the ethical guidelines of the Declaration of Helsinki. Informed consent was obtained from participants prior to enrollment, and ethics approval for the study was granted by the Palestinian Health Research Council Helsinki Committee. The study was conducted in two phases: development/translation and clinical validation, as outlined in Figure 1.

Translation of CLDEQ-8 into Arabic and development of Arabic-CLDEQ-8: The primary purpose of cross-cultural adaptation of a questionnaire is to develop a version in the target language (Arabic) that is comparable to the original version (English) in meaning and interpretation [16, 22, 28]. The English CLDEQ-8 was independently translated into Classical Arabic by a medical translator and a non-medical translator, both of whom were native Arabic speakers. A committee comprising three Palestinian ocular surface specialists and three Classical Arabic translators reviewed both Arabic translations, which then yielded a second draft of the Arabic-CLDEQ-8. The second draft was subsequently back-translated into English by two other Palestinian healthcare translators and two other bilingual translators, none of whom had seen the original version. This back-translation was compared to the original English version to identify inconsistencies, which were resolved by an advisory committee of 10 eye-care professionals. This step was included to ensure the accuracy of the forward translations. The pre-final version was tested on 10 Gazan soft contact lens wearers (6 men and 4 women) to assess their understanding and interpretation of the questionnaire items. Based on these interviews, the participants demonstrated a clear understanding of the instructions, response categories, and domains of the questionnaire. The final Arabic-CLDEQ-8 version that was developed during the pre-test, was utilized in the data collection for the clinical validation study (Figure 1).

Content validity assessment: Both qualitative and quantitative approaches were employed to assess the content validity of the questionnaire. For the qualitative assessment, the domains were presented to 19 experts in relevant medical and non-medical fields from the Nasser Eye Hospital, Islamic University-Gaza, and the European Gaza Hospital, who provided feedback on the grammar and wording of the domains. The quantitative content validity was assessed using the Content Validity Ratio (CVR) and the Content Validity Index (CVI) [29, 30]. For the CVR, experts were asked to rate each item as "essential," "useful but not essential," or "non-essential," and the responses were summarized to calculate the CVR. With the participation of 19 experts [31], the acceptable threshold for the CVR in this study was set at 0.87. The CVI was calculated by averaging the CVR across all domains, with any CVI above 0.73 considered an acceptable content validity of the scale.

The Arabic-CLDEQ-8 includes eight domains that evaluate symptoms related to dry eye across five dimensions. Three of these domains assess the frequency and intensity of eye discomfort, dryness, and fluctuating or blurred vision. The remaining two domains measure how often participants feel the need to blink or to remove their contact lenses. Responses are recorded using a Likert-type scale ranging from "Never" (0 points) to "Always" (4 points). The frequency of symptoms is rated from 0 (never) to 4 (constantly), while intensity is rated from 0 (none) to 5 (very intense). The maximum possible score is 36 points.

Validation of the Arabic-CLDEQ-8 among Arabic-speaking soft contact lens wearers: Based on literature suggesting that 30–40 participants are sufficient for pre-test evaluations of new translations, a sample size of 34 was deemed appropriate [28]. Individuals < 18 years of age, those who had been wearing soft contact lenses for fewer than 6 months, and those with systemic diseases were excluded.

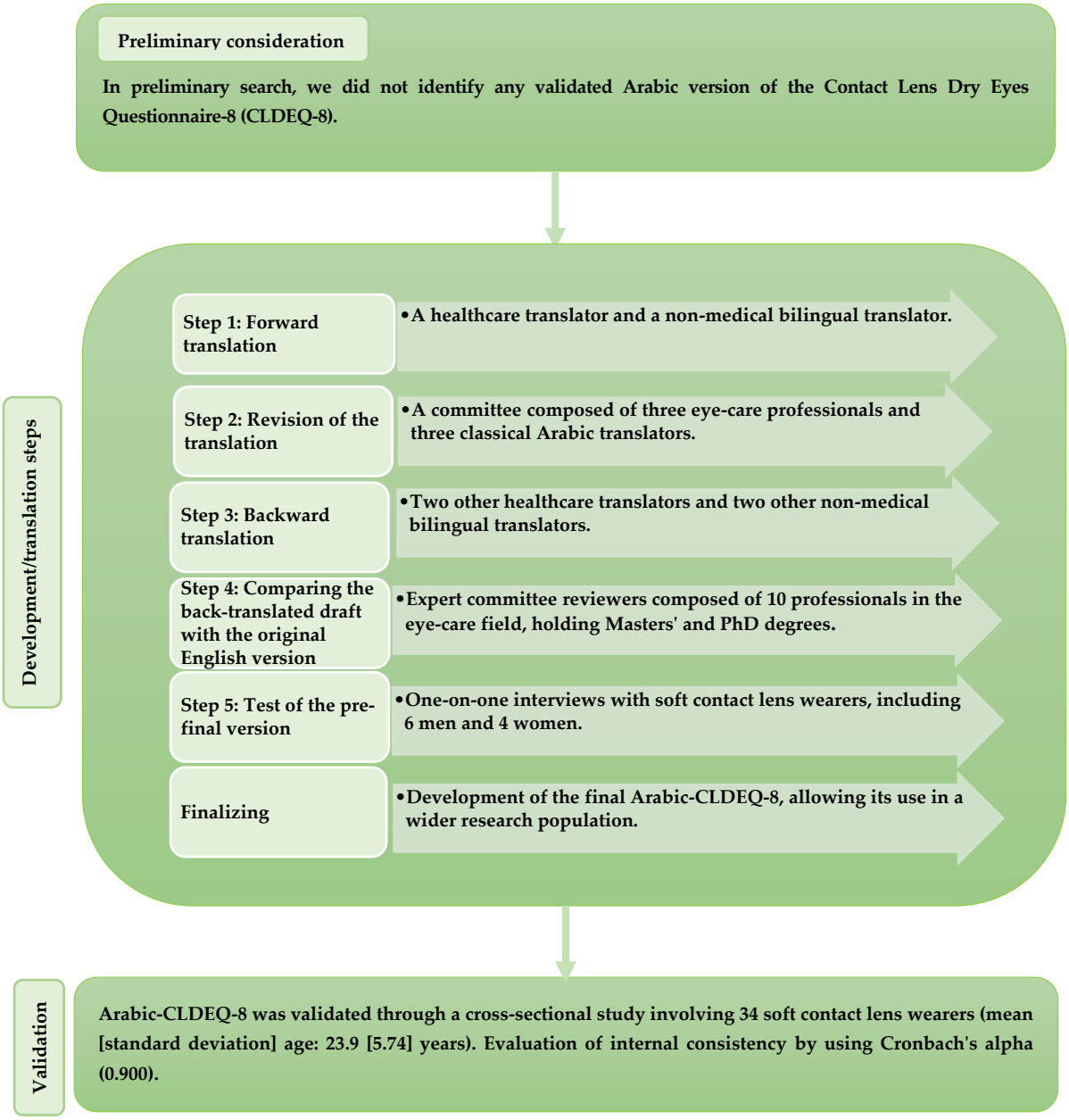

Figure 1. Flowchart illustrating steps in the translation and validation of the Arabic-CLDEQ-8.

To ensure the eligibility of individuals, a detailed ocular examination was performed using slit-lamp biomicroscopy. Based on this examination, we excluded individuals with ocular conditions other than refractive errors, such as eyelid anatomical or functional abnormalities that could cause ocular surface symptoms [32]; clinically significant anterior segment abnormalities, such as iritis or infections affecting the eye, eyelids, or adnexa [33]; and ocular or systemic diseases that could preclude safe soft contact lens use, including severe dry eye, corneal dystrophies, or uncontrolled diabetes [34]. Eligible participants from the Gaza Strip were invited to complete the Arabic-CLDEQ-8 on an online platform. Sociodemographic data of eligible participants—including sex, age, and education level (secondary school, bachelor's, master's, and doctorate)—were recorded. Questions about contact lenses were also included, such as those on contact lens replacement frequency, type of soft contact lenses, and duration of contact lens use.

Domain analysis for assessing scale reliability: The overall reliability of the Arabic-CLDEQ-8 questionnaire, based on responses from 34 Gazan soft contact lens wearers, was evaluated using a 5-point Likert scale. Responses ranged from "Never" (0) to "Always" (4). The frequency of symptoms was rated from 0 (never) to 4 (constantly), while intensity was rated from 0 (none) to 5 (very intense) [35]. Reliability was analyzed using item–total correlations and Cronbach's alpha [16], which indicated how well the domains aligned conceptually [22, 24]. Domains with item–total correlations below 0.30, or those with a Cronbach's alpha value higher than the overall value of 0.913, were excluded.

Data were collected in Microsoft Excel 2019 (Microsoft Corporation, Redmond, WA, USA) and analysis was performed using the Statistical Package for the Social Sciences software version 26.0 (IBM Corp., Armonk, NY, USA). As stated earlier, reliability testing for the Arabic-CLDEQ-8 was conducted using Cronbach's alpha and the corrected index of homogeneity [16, 19, 21-24]. This corrected index measures the correlation between individual domain responses and the overall test score [16]. Cronbach's alpha values were interpreted according to George and Mallery's criteria: < 0.5 indicated unacceptable, 0.5 – 0.6 indicated poor, 0.6 – 0.7 indicated questionable, 0.7 – 0.8 indicated acceptable, 0.8 – 0.9 indicated good, and > 0.9 indicated excellent reliability [36]. The reliability of each subset of questions related to specific symptoms and the overall questionnaire's reliability for assessing symptom frequency and severity were also evaluated. Data of contact lens wearers are summarized as mean (standard deviation [SD]) or as frequency (percentage), according to the data type.

RESULTS

Table 1 summarizes the demographic characteristics of participants recruited in the clinical validation phase. Thirty-four contact lens wearers with a mean (SD) age of 23.9 (5.7) (range: 18–41) years completed the questionnaires. This group included 30 (88.2%) women, 30 (88.2%) individuals with a bachelor's degree, 25 (73.5%) participants who replaced their contact lenses monthly, 29 (85.3%) who wore spherical lenses, and 22 (64.7%) with fewer than 2 years of contact lens-wearing experience (Table 1). The mean (SD) daily contact lens-wear time was 10.5 (7.5) (range: 9–12) hours.

Table 1. Demographic characteristics of participants involved in the validation phase of Arabic- CLDEQ-8

Variable	Men (n = 4)	Women (n = 30)	Total (n = 34)
Age (y), Mean ± SD	22.2 ± 4.6	23.3 ± 5.5	23.9 ± 5.7
Education level, n (%)			
Secondary school	0 (0.0)	2 (6.7)	2 (5.9)
Bachelor degree	3 (75.0)	27 (90.0)	30 (88.2)
Master degree	1 (25.0)	0 (0.0)	1 (2.9)
Doctor of philosophy	0 (0.0)	1 (3.3)	1 (2.9)
Soft contact lens replacement frequency, n (%)			
Daily disposables	1 (25.0)	2 (6.7)	3 (8.8)
Two-weeks replacement	0 (0.0)	6 (20.0)	6 (17.6)
Monthly replacement	3 (75.0)	22 (73.3)	25 (73.5)
Type of soft contact lens correction, n (%)			
Spheric	3 (75.0)	26 (86.6)	29 (85.3)
Toric	0 (0.0)	2 (6.7)	2 (5.9)
One eye spheric and 1 eye toric	0 (0.0)	0 (0.0)	0 (0.0)
Multifocal	1 (25.0)	2 (6.7)	3 (8.8)
Duration of contact lens wearing, n (%)			
< 2-year	2 (50.0)	20 (66.7)	22 (64.7)
2–6-year	1 (25.0)	6 (20.0)	8 (23.5)
6–10-year	1 (25.0)	1 (3.3)	2 (5.9)
> 10-year	0 (0.0)	3 (10.0)	2 (5.9)

Abbreviations: CLDEQ-8, Contact Lens Dry Eye Questionnaire-8; y, years; SD, standard deviation; n, number; %: percentage.

Table 2. Level of internal consistency among domains of the Arabic-CLDEQ-8

Domain	Symptom evaluated	Cronbach's Alpha score
D1a & D1b	Ocular discomfort	0.743
D2a & D2b	Ocular dryness	0.704
D3a & D3b	Blurry and fluctuating vision	0.704
Full domains	All symptoms	0.900

Abbreviations: CLDEQ-8, Contact Lens Dry Eye Questionnaire-8; D, domain.

Table 3. Analysis of the domains of the Arabic-CLEQ-8

Domain	Score, Mean ± SD	Corrected domain- Total Correlation	Cronbach's Alpha if item deleted
1a	2.41 ± 1.05	0.740	0.881
1b	2.62 ± 1.05	0.614	0.892
2a	1.97 ± 1.17	0.799	0.874
2b	1.79 ± 0.98	0.700	0.885
3a	1.97 ± 1.17	0.799	0.874
3b	1.79 ± 0.98	0.700	0.885
4	2.24 ± 1.02	0.495	0.902
5	1.79 ± 1.39	0.660	0.891

Abbreviations: CLDEQ-8, Contact Lens Dry Eye Questionnaire-8; D, domain; SD, standard deviation.

Table 4. Content Validity Ratio and Content Validity Index of Arabic-CLEQ-8 domains

Domain	CVR	CVI
1a. هل شعرت بإجهاد في عينيك خلال الأسبوعين الماضيين؟	1.000	1.000
1b. هل شعرت بإجهاد في عينيك بسبب العدسات اللاصقة عند نهاية فترة ارتدائها؟	0.895	0.947
2a. هل شعرت بجفاف في عينيك خلال يوم عادي في الأسبوعين الماضيين؟	0.579	0.799
2b. ما تقديرك لشدة الجفاف الذي أصاب عينيك عند نهاية ارتداء العدسات اللاصقة؟	0.474	0.747
3a. كم مرة شعرت بتقلب الرؤية بين الوضوح والضبابية في نهاية يومك خلال الأسبوعين الماضيين؟	0.579	0.799
3b. عند الإحساس بضبابية في الرؤية، إلى أي مدى كنت قادراً على ملاحظة الضبابية في نهاية يومك؟	0.684	0.842
4. كم مرة شعرت بالازعاج في عينيك فميّلت لإغلاقهما خلال يوم روتيني في الأسبوعين الماضيين؟	0.789	0.895
5. هل شعرت بالضيق من ارتداء العدسات اللاصقة مما اضطرّك لإيقاف عملك ونزعها خلال الأسبوعين الماضيين؟	0.895	0.947

Abbreviations: CLDEQ-8, Contact Lens Dry Eye Questionnaire-8; D, domain; CVR; content validity ratio; CVI, content validity index. Note: In line with validation studies of the CLDEQ-8 questionnaire translated into other languages [16, 17, 20, 22-24], we have also included all items from the Arabic version of the CLEQ-8 in this Table.

All domains of the questionnaire were reported to be easily understandable and clear. The questionnaire showed excellent internal consistency and reliability, with a Cronbach's alpha of 0.900. The item on "ocular discomfort" (Domains D1a & D1b) had a Cronbach's alpha of 0.743, while "ocular dryness" (Domains D2a & D2b) and "blurry/fluctuating vision" (Domains D3a & D3b) each had a Cronbach's alpha of 0.704 (Table 2). The corrected index of homogeneity exceeded 0.50 for all domains except D4, indicating a strong link between each domain and the overall results of the questionnaire.

The mean (SD) score of the participants on the Arabic-CLDEQ-8 was 17.00 (6.69) (range: 2–30), with 76.5% (n = 26) of participants scoring 12 or more. For symptom frequency, scores ranged from 0 (absent) to 4 (constant), with mean scores between 1.97 and 2.41. The domain for ocular discomfort (D1a) had the highest mean (SD) frequency score, at 2.41 (1.05) (range: 0–4). The domains for ocular dryness (D2a) and blurry/fluctuating vision (D3a) each had mean (SD) frequency scores of 1.97 (1.17) (range: 0–4). Intensity scores for various domains ranged from 1.79 to 2.62. The ocular dryness intensity (D2b) and blurry/fluctuating vision intensity (D3b) had the lowest mean (SD) intensity scores, at 1.79 (0.98), while ocular discomfort intensity (D1b) had the highest mean (SD) score of 2.62 (1.05). The domain with six response options regarding the urgency of needing to remove contact lenses (D5) had a mean (SD) score of 1.79 (1.39) (Table 3). The CVI was calculated as 0.73 and the CVR as 0.87. Domains D1a, D1b, D2a, D3a, D3b, D4, and D5 were found to be clear and simple, while domain D2b demonstrated an average level of content validity (Table 4).

DISCUSSION

The newly developed Arabic version of the CLDEQ-8 questionnaire showed robust psychometric properties for assessing dry eye among contact lens wearers. Similar results were found in validation studies of the CLDEQ-8 questionnaire translated into other languages. Table 5 summarizes details for development/translation process and the clinical validation outcomes of relevant studies [16, 17, 19-24].

In the clinical validation phase, this study predominantly involved female participants, which aligns with the trend of more frequent use of contact lenses among women than among men [16, 37, 38]. Dry-eye symptoms are the most common issue associated with contact lens use and are the leading cause for discontinuation of their use, making it crucial to understand the prevalence and characteristics of this condition and to monitor changes among contact lens wearers [39, 40].

In this study, the mean (SD) score on the Arabic-CLDEQ-8 was 17.00 (6.69), with 76.5% (n = 26) of participants scoring 12 or more. The findings indicate that all participants experienced at least one dry-eye symptom. For symptom frequency, scores ranged from 0 (absent) to 4 (constant), with mean scores between 1.97 and 2.41. Sapkota et al. [41] found that up to 97% of contact lens wearers experienced at least one dry-eye symptom, whether it was occasional, frequent, or constant. The most commonly reported symptom among participants was ocular dryness, which has also been noted as a prevalent symptom in other questionnaires [39, 41]. These consistent findings across different questionnaires suggested agreement among various cultural and demographic groups, supporting the adaptability and relevance of the Arabic-CLDEQ-8 by aligning with results observed with other translations of this questionnaire in different populations [39, 41].

Chalmers et al. [42] found that a CLDEQ-8 score of 12 or higher was effective in distinguishing between patients who rated their contact lens experience as excellent or very good (with a score below 12) and those who rated it as bad, regular, or merely good [42]. This distinction implied that individuals in the latter group may significantly benefit from contact lens refitting or other interventions. Zeri et al. [24] found that a cutoff score of 12 points on the Italian version of the CLDEQ-8 proved to be the most effective in balancing sensitivity and specificity when distinguishing wearers who rated their contact lenses as “Excellent/Very Good” from those who described their experience as “Good/Fair/Poor” [24]. In the current study, over 75% of participants scored 12 or higher, reflecting a significant level of discomfort related to dry-eye symptoms among contact lens wearers in Palestine. This cultural adaptation of the CLDEQ-8 has yielded an Arabic-language tool that accurately measures the frequency and intensity of common dry-eye symptoms in contact lens wearers. This new questionnaire effectively translates patient complaints into a clear numerical score and is user-friendly for both patients and clinicians.

Table 5. Summary of studies [16, 17, 19-24] on validation of the Contact Lens Dry-Eye Questionnaire-8 (CLDEQ-8) in different languages

Author (Year)	Language	Development/translation process	Validation
Garza-Leon et al. (2019) [16]	Spanish	The Spanish version of the CLDEQ-8 was developed through a meticulous process of cultural adaptation, psychometric evaluation, and clinical validation. Initially, the translation–retro-translation method was employed, where two independent native Spanish-speaking translators carefully adapted the questionnaire from English to Spanish. This was followed by an in-depth assessment by a committee of experienced clinicians who ensured semantic equivalence and crafted a precise Spanish version of the questionnaire. To guarantee its effectiveness, the translated version underwent rigorous testing in a pilot study with contact lens wearers, allowing researchers to evaluate the wearers' comprehension of the terminology and their overall impressions. The data collected were analyzed to refine the final version of the questionnaire. To confirm the accuracy of this adaptation, the final version was retro-translated into English by a native English-speaking translator and was compared with the original CLDEQ-8. This meticulous process confirmed that there were no meaningful differences, and that the Spanish version is both reliable and effective for contact lens wearers.	The new Spanish version of the CLDEQ-8 has undergone rigorous clinical validation through a prospective study with 50 contact lens wearers, with a mean (SD) age of 21.50 (1.66) years. The study revealed a mean (SD) CLDEQ-8 score of 13.28 (6.81) points, ranging from 1 to 31. Impressively, the internal consistency was established at 0.89 using Cronbach's alpha, with a corrected homogeneity index exceeding 0.50 across all domains assessed. These compelling results affirmed that the Spanish version of the CLDEQ-8 is not only reliable but is also an essential tool for accurately measuring the frequency and intensity of dry-eye symptoms among Spanish-speaking contact lens wearers.
Koh et al. (2019) [17]	Japanese	The Japanese version of the CLDEQ-8 was carefully developed through a forward translation from English to Japanese by three Japanese eye-care professionals. After reaching a consensus on the wording of the translation, three bilingual soft contact lens wearers—who were neither eye-care professionals nor familiar with the original English version of the questionnaire—performed a back-translation into English. When this back-translation did not align with the original CLDEQ-8, one-on-one interviews were conducted with the bilingual soft contact lens wearers to discuss the necessary changes. This process ensured that the final Japanese version accurately reflected the concepts of the original CLDEQ-8.	The Japanese version of the CLDEQ-8 was validated through a cross-sectional study involving 300 Japanese wearers of spherical disposable soft contact lenses (including daily, 2-week, and monthly disposables). This study assessed participants' overall opinion of their soft contact lenses, with repeatability tested in a subgroup of 50 individuals. The authors found a strong significant linear relationship between the Japanese CLDEQ-8 scores, the overall opinion of soft contact lens wearers, and self-assessments of eye dryness. A cutoff score of less than 11 points on the Japanese version of the CLDEQ-8 was most strongly associated with patients who reported an "Excellent" or "Very Good" overall opinion of their soft contact lenses. This cutoff score resulted in an accuracy of 66%, a sensitivity of 67%, and a specificity of 66%. The Japanese CLDEQ-8 successfully distinguished among soft contact lens wearers with differing overall opinions, similar to the original English version of the CLDEQ-8.
Dogan et al. (2020) [19]	Turkish	The Turkish version of the CLDEQ-8 was meticulously developed using back-translation methods. To ensure its effectiveness, this translated version was subjected to rigorous testing in a pilot study involving 10 Turkish contact lens wearers. This allowed researchers to assess the wearers' understanding of the terminology and gather their overall impressions as part of a pre-test evaluation.	The Turkish version of the CLDEQ-8 was validated through a cross-sectional study involving 100 healthy Turkish wearers of silicone-hydrogel soft contact lenses. All individuals had refractive errors. The participants had a mean (SD) age of 25.19 (7.03) years. All domains of the questionnaire demonstrated significant consistency with the Rasch model and were unidimensional. The Cronbach's alpha was 0.873, and the person-separation index was 0.867, both exceeding the acceptable threshold of 0.7—this instrument demonstrated impressive internal consistency. No functional differences in the questionnaire domains across different age groups were found, reinforcing its versatility. The Turkish version of the CLDEQ-8 conformed to the Rasch model and supported the one-dimensional assumption. Overall, the questionnaire exhibited internal consistency and was found to be both valid and reliable for assessing Turkish contact lens wearers.
Ribeiro et al. (2022) [20]	Portuguese	The development of the Portuguese version of the CLDEQ-8 was meticulously executed through a rigorous three-phase process. Initially, two independent translators undertook the task of translating and transculturally adapting the English CLDEQ-8 into Portuguese. This version was then thoroughly evaluated by an interdisciplinary panel, comprised of two professors from the department and one resident. In the second phase, two independent native speakers performed a backward translation of the Portuguese version back into English. This step was critical, as the resulting translation was meticulously compared with the original English version by the same interdisciplinary panel. Finally, in the third phase, the finalized version was implemented with 30 participants to examine inter- and intra-observer concordance.	The Portuguese version of the CLDEQ-8 achieved Kappa agreement values of 0.7 or higher across all questions, indicating a robust agreement with the English version. When evaluating the ocular surface among participants, the authors found significant differences between 61 soft contact lens wearers and 20 controls, except for parameters assessing tear volume, such as tear meniscus height and the Schirmer test. The validated Portuguese version of the CLDEQ-8 serves as a useful resource for advancing understanding of contact lens wearers' needs. This study highlighted a significant link between the use of soft contact lenses and disturbances in the ocular surface.

Continued. Table 5. Summary of studies [16, 17, 19-24] on validation of the Contact Lens Dry-Eye Questionnaire-8 (CLDEQ-8) in different languages

Lortie-Milner et al. (2023) [22]	French	The French version of the CLDEQ-8 was developed by using a meticulous process involving forward translation and synthesis by a bilingual native French translator, followed by backward translation by a bilingual native English translator. An expert committee, consisting of the initial translator, four optometrists with clinical practice and research experience, and a specialist in research methodology, collaborated to create a consensus pre-test version. Finally, cognitive interviews were conducted with nine symptomatic soft contact lens wearers to evaluate the consensual pre-test version.	A web-based version of the French CLDEQ-8 was distributed to 63 contact lens wearers, with a mean (SD) age of 34.2 (10.1) years. Participants completed the questionnaire at two different time points, spaced 7 days apart. The internal consistency and test–retest reliability were assessed using Cronbach's alpha and the intra-class correlation coefficient, which yielded values of 0.928 and 0.944, respectively. Additionally, the convergent validity between the French CLDEQ-8 score and the participants' overall opinion of their contact lenses was evaluated, which revealed a moderately strong correlation (correlation coefficient of 0.714). The French version of the CLDEQ-8 was found to be user-friendly, reliable, and culturally adapted for French speakers in Canada.
Zeri et al. (2023) [24]	Italian	The Italian version of the CLDEQ-8 was developed through a comprehensive and rigorous process. Initially, two native Italian researchers specializing in contact lenses and fluent in English conducted a forward translation, ensuring that the meaning of the items was accurately conveyed. Next, a backward translation was performed by two other native Italian researchers, also fluent in English and residing in the UK. To enhance the quality further, a native English-speaking contact lens researcher in the UK meticulously compared the translated and original versions to identify any discrepancies. The alignment between the backward and forward translations, along with any necessary adjustments for effective cross-cultural adaptation of the questionnaire, was overseen and guided by an independent panel of two native Italian-speaking researchers who possess strong English language skills and had experienced living and working in the UK.	The Italian version of the CLDEQ-8 was validated through a cross-sectional study involving 240 soft contact lens wearers aged between 18 and 70 years. Notably, a cutoff score of 12 points on this version proved to be the most effective in balancing sensitivity and specificity when distinguishing wearers who rated their contact lenses as “Excellent/Very Good” from those who described their experience as “Good/Fair/Poor.” The evaluation of internal consistency and test–retest reliability was performed using Cronbach's alpha and the intra-class correlation coefficient, yielding impressive values of 0.86 and 0.88, respectively. The Rach psychometric properties analysis revealed strong qualities of the Italian version of the CLDEQ-8, although some weaknesses were noted. Importantly, the infit and outfit statistics for the eight items fell comfortably within the accepted range of 0.7 to 1.3, underscoring the reliability of this tool.
Mylona et al. (2023) [23]	Greek	The Greek version of the CLDEQ-8 was developed through a comprehensive and rigorous process. First, two medical doctors, fluent in both Greek and English, conducted a precise forward translation. This initial draft was then scrutinized by a panel of three specialists in dry-eye conditions and contact lenses, to enhance its clarity. Subsequently, a native Greek speaker performed a backward translation, which was compared with the original CLDEQ-8 to pinpoint any discrepancies. The expert panel then carefully revised the draft, ensuring that it accurately captured the original intent and meaning. The final draft was tested in 20 patients experiencing contact lens discomfort. Their understanding of the items was confirmed, allowing its use in a wider research population.	The Greek version of the CLDEQ-8 was validated through a cross-sectional study involving 150 healthy wearers of monthly disposable silicone-hydrogel soft contact lenses. All participants had refractive errors. The participants had a mean (SD) age of 22.1 (3.03) years. The authors identified significant flaws in the validity and reliability of the original scoring system for the Greek version of the CLDEQ-8. Although the person-reliability value was acceptable at 0.87, the person-separation statistic was 2.62, and the item-reliability was markedly low at 0.63, with an item-separation statistic of only 1.3. Conversely, a satisfactory Cronbach’s alpha reliability index of 0.89 was recorded. Recognizing these limitations, the authors revised the scoring system, resulting in a new measurement model that demonstrated acceptable dimensionality and enhanced reliability indexes. The results indicated an acceptable person-reliability of 0.9, a person-separation statistic of 2.74, an item-reliability of 0.91, an item-separation statistic of 3.11, and a robust Cronbach’s alpha reliability index of 0.9. The implementation of Rasch modeling provided a thorough analysis of the scale's psychometric characteristics. As a result, the Greek version of the CLDEQ-8 has emerged as a psychometrically valid and reliable tool for effectively assessing contact lens discomfort in Greek-speaking populations.
Guo et al. (2024) [21]	Chinese	The CLDEQ-8 underwent forward and backward translation by the Department of Chinese and Bilingual Studies at the Hong Kong Polytechnic University. The three versions (traditional Chinese, simplified Chinese, and back-translated English) were translated into both traditional and simplified Chinese. An expert committee of native Mandarin or Cantonese-speaking ophthalmologists and optometrists, proficient in English and representing various regions, reviewed and approved the final versions. The online questionnaire was distributed to participants in Hong Kong, mainland China, Taiwan, and Singapore, with invaluable support from partnering universities. At the beginning of the survey, participants were asked to indicate their preference for completing either the Traditional or Simplified Chinese version of the CLDEQ-8.	The validation and repeatability of the Chinese version of the CLDEQ-8 were evaluated by recruiting regular soft contact lens wearers aged 18 years and older who were proficient in both English and Chinese. Participants were invited to complete both the English and Chinese versions (in either traditional or simplified script) of the CLDEQ-8. Ninety-six individuals completed both versions. Of these, 52 participants (54%) completed the questionnaire a second time. The Cronbach’s alpha coefficient for the Chinese CLDEQ-8 reached 0.913, slightly outperforming the English version at 0.872. Although the difference between the two attempts was statistically significant, it lacked clinical relevance. However, the intra-class correlation coefficient was 0.818, indicating high reliability between the first and second attempts, despite the minor difference. No statistically significant differences were observed between the scores of the English and Chinese versions.

The Arabic used in the current translated CLDEQ-8 consists of simple, commonly understood terms, making it accessible to nearly all Arabic speakers. The CVI was calculated as 0.73 and the CVR as 0.87, while most domains were deemed clear and simple. However, the translation and cultural adaptation were specifically tailored for the Gazan population. Similarly, the clinical validation step for the French [22], Turkish [19], or Spanish [16] versions of the CLDEQ-8 were conducted in a specific population speaking each of these languages [16, 19, 22]. Variations in semantic fluency and emotional expression may be present between Gazans and Arabic speakers from other regions of the Arab world, which should be considered when applying the questionnaire to populations outside of Gaza [22, 43, 44]. Furthermore, future studies should aim to confirm its validity in other Arabic-speaking regions.

No previous study has validated an Arabic version of the CLDEQ-8, as was done in the present study. However, the study had some potential limitations. One important consideration is that the clinical validation was conducted in a Gazan population, which may differ from the population of other Arabic-speaking regions. This should be taken into account when using the newly translated questionnaire in research involving Arabic-speaking participants in future. While the sample size was statistically sufficient, it was relatively small. Conducting similar research on a larger scale, with a broader age range and participants from various geographical locations, while also considering factors such as lens type and replacement frequency, could yield more reliable conclusions. Additionally, due to a lower number of recruited men among soft contact lens wearers, we were unable to assess any gender differences. Further studies addressing these limitations and utilizing the current Arabic version of the questionnaire are needed to test the repeatability of our findings.

CONCLUSIONS

The translated and validated Arabic-CLDEQ-8 is a reliable and valid tool that allows clinicians to collect precise, objective, and measurable information about the ocular symptoms experienced by soft contact lens wearers. It could be a helpful tool in assessing their current condition, monitoring changes, and guiding follow-up care, while also providing valuable data for research. Further studies utilizing the current Arabic version of the questionnaire in other Arabic-speaking regions are needed to test the repeatability of our findings.

ETHICAL DECLARATIONS

Ethical approval: The study adhered to the ethical guidelines of the Declaration of Helsinki. Informed consent was obtained from participants prior to enrollment, and ethics approval for the study was granted by the Palestinian Health Research Council Helsinki Committee.

Conflict of interests: None.

FUNDING

None.

ACKNOWLEDGMENTS

The researchers extend their heartfelt gratitude to the cases who actively contributed to and provided cooperation in this study.

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