

Impact of Dry Eye on Daily Life and Patient Satisfaction Using Eye Drops. Psychometrics Properties of a New Scale

The DEAL® questionnaire (Dry Eye dAily Life)

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INTRODUCTION

METHODS

- Dry eye disease (DED) impacts quality of life. Ocular Surface Disease Index (OSDI) and Dry Eye questionnaire (DEQ-5) are 2 frequently used tools¹. OSDI is psychometrically sound but its 12 items do not cover all the patient experience. Validity of DEQ-5 is questioned and its 1-month recall period may introduce a memorization bias. The aim of this study was to check the psychometrics properties of a new scale capturing additional concepts important to the patients.
- Baseline data were from the TEARS cohort of 312 DED patients (Spain and UK) treated by a combination of sodium hyaluronate + trehalose. Apart of OSDI, DEQ-5, and a global satisfaction, patients completed new questions (9 on impact of dry eye and 10 on satisfaction with eye drops) identified through a literature review and expert committee (**Table 1**). These 19 items have a 4 to 5-point Likert scale answers, and recall period is the last 3 days.

RESULTS

- Mean age of patients was 57.9±15.2 yrs, 82.4% were women.
- Iterative factorial analyses were performed. 4 items were deleted (high inter-item correlation, or no factor loading).
- A 4-factor structure was found robust, ranked by their cumulative variance, and named by their content analysis: 1/ DED impact on daily activities (n=6); 2/ perception of relief/being comfortable/duration with eye drops (n=4); 3/ DED impact on mood/sleep (n=3); 4/ eyes drops easiness of use (n=2) (**Figure 1**).
- The factor loading matrix shows the variables that load on each of the extracted factors (**Table 2**).

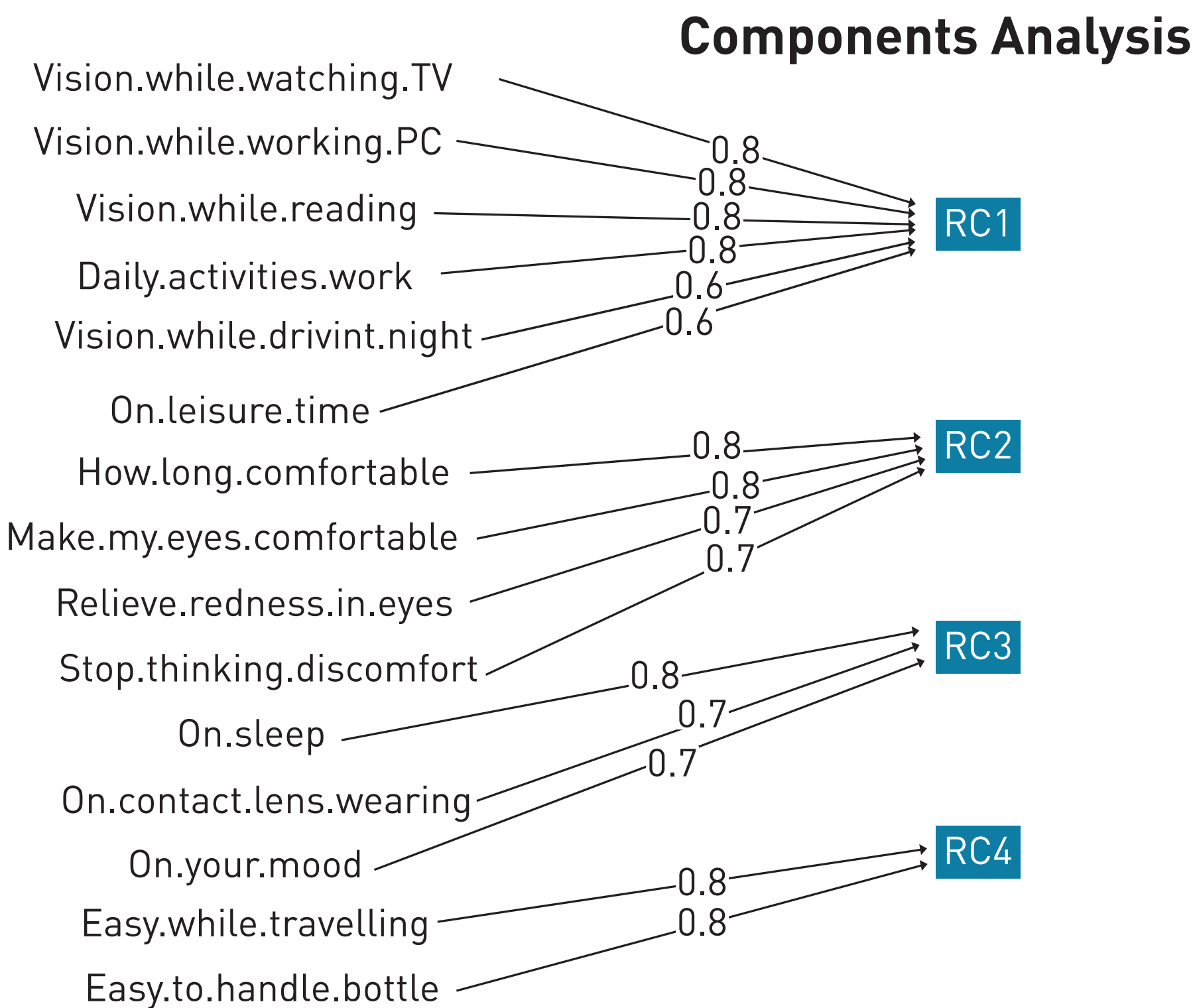


Figure 1: Principal components analysis (using varimax) with 4 components

Please tell us about the impact of dry eye disease on your daily life? =

On Vision while Reading

On Vision while Watching television

On vision while driving at night

On vision while working on the computer

On daily activities/work

On leisure time

On contact lens wearing

On your mood

On sleep

Thinking about your current drops, please rate your agreement with this statement:

My current drops relieve my symptoms

I find it easy to handle the bottle

I find it easy to instil

I find my current drops easy to carry when travelling

My current drops make my eyes comfortable

My current drops feel cool when applied

I am satisfied with the relief my current drops bring

I stop thinking about the discomfort of my eyes every day

My current drops relieved the redness in my eyes

How long do your eyes feel comfortable after the instillation of these artificial tears?

4-point scale:

- No impact,
- Minor impact,
- Moderate impact,
- Severe impact

5-point scale:

- Strongly disagree,
- Disagree,
- Neither agree nor disagree,
- Agree,
- Strongly agree

5-point scale:

- <5min
- 5min-20min
- 20min-60min
- 60min-120min
- >120 min

	RC1	RC2	RC3	RC4
Vision.while.reading	0.801	0.135	0.143	0.042
Vision.while.watching.TV	0.824	0.080	0.126	0.161
Vision.while.driving.night	0.638	0.081	0.165	-0.076
Vision.while.working.PC	0.806	0.154	0.073	-0.054
Daily.activities.work	0.766	0.170	0.245	0.130
On.leisure.time	0.587	0.223	0.511	0.174
On.contact.lens.wearing	0.130	-0.024	0.718	0.029
On.your.mood	0.424	0.229	0.682	0.001
On.sleep	0.137	0.084	0.825	0.042
Easy.to.handle.bottle	0.031	0.187	0.026	0.836
Easy.while.travelling	0.055	0.213	0.066	0.838
Make.my.eyes.comfortable	0.089	0.751	0.093	0.387
Stop.thinking.discomfort	0.338	0.708	0.087	0.127
Relieve.redness.in.eyes	0.185	0.733	-0.004	0.278
How.long.comfortable	0.055	0.820	0.122	-0.029

Table 2: Statistical analysis correlation variable items. (Factor loading, have dimmed out values < 0.5)

- Reliability of the dimensions was confirmed by Cronbach alpha ranging from 0.67 to 0.86. Scores were calculated (range: 0-100 worst), e.g. 35.8±20.6 for global score. For the concurrent validity, logical correlations between the 4 dimensions and OSDI, DEQ-5 and global satisfaction ranged from 0.088 (Easiness vs OSDI) and 0.715 (impact on daily activities vs DEQ-5). Correlation between global score vs OSDI was moderate at 0.440 confirming that these new items bring additional information that is not captured by OSDI. Four of the 5 DEQ-5 items were highly inter-correlated (> 0.8) challenging its validity (**Table 3**).

	alpha	95% C.I. (Bootstrapped based on 1000 samples)	
PC1	0.861	0.814	0.894
PC2	0.801	0.753	0.840
PC3	0.785	0.669	0.862
PC4	0.671	0.574	0.748
Overall	0.782	0.707	0.836

Table 3: Descriptive statistics for the estimated values of the latent variables in the model: Cronbach's alpha

CONCLUSION

- This 15-item 4-dimension scale has robust psychometrics properties. The next step is to quantify its responsiveness to change.
- The DEAL® (Dry Eye dAily Life) questionnaire has been used for the evaluation of patient perception on comfort and impact on daily life in a study “Patient-Reported Outcomes Measurements in Dry Eye Patients after 84 days of Daily Treatment with a preservative-free combination containing sodium hyaluronate and trehalose: the TEARS study”.

(1) Okumura Y, Inomata T, Iwata N, Sung J, Fujimoto K, Fujio K, Midorikawa-Inomata A, Miura M, Akasaki Y, Murakami A. A Review of Dry Eye Questionnaires: Measuring Patient-Reported Outcomes and Health-Related Quality of Life. Diagnostics (Basel). 2020 Aug 5;10(8):559.