A confirmatory factor analysis for the Dutch Screening Visual Complaints questionnaire in people with multiple sclerosis.

van der Feen, Fleur; de Haan, Gera; van der Lijn, Iris; Huizinga, F.; Heersema, Thea; Meilof, Jan F.; Heutink, Joost

Screening for visual complaints in people with multiple sclerosis

F.E. van der Feen[1,2], G.A. de Haan[1,2], I. van der Lijn[1,2],F.B.M Fuermaier[1], D.J. Heersema[3], J.F. Meilof[4], J. Heutink[1,2]

1. Up to 90% of people with MS report visual complaints

A recent study points out that the prevalence of a great variety of visual complaints is high among people with multiple sclerosis. Complaints can occur in any type, anytime along the disease course and regardless of a prior history of optical neuritis (van der Feen, 2022).

Examples of the reported visual complaints:

- Needing more time to see
- Being blinded by bright light
- Needing more light
- Light/dark adjustment
- Changes in visual field
- Shaky images
- Trouble focusing
- Reduced contrast
- Dry eyes
- Depth perception

2. The Screening Visual Complaints questionnaire has been developed to screen for visual complaints

People with a neurological disorder often have difficulties describing the visual complaints, may be difficult to recognized and may be mistaken for more predominant symptoms, and may be described as a headache or only as blurry. The visual complaints of people with MS or other kinds of neurodegenerative diseases may be underestimated and referral to further care stays out. This is undesirable, since visual complaints negatively quality of life, while there are rehabilitation options available.
In order to facilitate attention for visual complaints, the Screening Visual Complaints questionnaire (SVCq) was developed (Huizinga, 2020). The SVCq is a short self-report questionnaire than easily and quickly screens for the presence of visual complaints in 19 items. A validation study of the SVCq in a healthy population showed promising psychometric properties.

3. A 3-factor model and a 5-factor model were revealed to form 5 different subscales of visual complaints

An exploratory factor analysis was also performed in the validation study. A 3-factor model and a 5-factor model was revealed. Hence, the SVCq can be divided in different subscales.

Scale	Items of SVCq
Diminished visual perception*	
Function related	Unclear vision, Trouble focusing, Depth perception, Reduced Contrast, Reading problems
Luminance related	Blinded by bright light Needing more time Light/dark adjustment
Task related	Needing more time Looking for something Trouble in traffic
Altered visual perception	Double vision, Shaky images Visual field, Color vision, Seeing things that other do not Distorted images
Ocular discomfort	Painful eyes Dry eyes

* Divided into three scales to create the 5-factor model from the 3 factors

4. A confirmatory factor analysis in a MS-cohort showed good fit of the models

In order to use the scales of the SVCq for people with MS, a confirmatory factor analysis was performed in a cohort of people with MS (n = 493). We investigated the 3- and 5- factor models, and also a 1-factor model. To estimate the fit of the models in the MS-cohort, different fit-statistics were calculated:

- Satorra Bentler Scale Chi-square ($\chi 2/df$)
- Root Mean Squared Error of Approximation with a confidence interval
- Standardized Root Mean Square Residual
- Comparative Fit Index

All three models showed good fit statistics and can be applied to people with MS. Moreover, using the scales has merit, since the 3- and 5-factor models outperformed the one-factor model. The 5-factor model also outperformed the 3-factor model.

5. How can the SVCq help clinical care for people with MS with the visual complaints?

The SVCq as a whole (1-factor model) may be used to quickly screen for the presence of visual complaints.
The different scales may be used to further attend to the nature of the complaints and to guide further steps.
Subscales *Diminished visual perception* (function related, luminance related and task related) and *Altered visual perception* may be used to further guide care and rehabilitation in order to minimize the effect of visual complaints on daily life and quality of life.

In the case of dry eyes or painful eyes (*ocular discomfort*), medication might need to be revised and referral to an ophthalmologist would be advised.

Since visual complaints may develop in any one who has MS anytime, it is advised to regularly screen for visual complaints, for example during regulars visits to the neurologist once a year.

6. Here you can find a link where to the SVCq and some further reading on visual complaints in MS

SVCq

Further reading

1. University of Groningen, Clinical and Developmental Neuropsychology, Groningen, The Netherlands. 2. Royal Dutch Visio, Centre of expertise for blind and partially sighted people, Huizen, The Netherlands. 3. University Medical Centre Groningen, Department of Neurology, Groningen, The Netherlands. 4. Martini Hospital, Department of Neurology, Groningen, The Netherlands.

Huizinga, F., Heutink, J., de Haan, G.A., van der Lijn, I., van der Feen, F.E., Vrijling, A., Melis-Dankers, B.J.M., de Vries, S., Tucha, O., Koerts, J. (2020). The Development of the Screening questionnaire for patients with neurodegenerative disorders: Evaluation of psychometric features in a community sample. *PLOS ONE,* 15(4): e0232232

Van der Feen, F.E., de Haan, G.A., van der Lijn, I., Huizinga, F., Meilof, J.F., Heersema, D.J., Heutink. J. (2022). Recognizing visual complaints in people with multiple sclerosis: Prevalence, nature and associations with key characteristics. *Multiple Sclerosis and Related Disorders*, 57: 103429

Contact:
Fleur van der Feen
University of Groningen, The Netherlands
Royal Dutch Visio, The Netherlands
f.e.van.der.feen@rug.nl