Evaluation of cross-sectional and longitudinal construct validity of two vision-related quality of life questionnaires: The LVQOL and VCM1

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Abstract

The Low Vision Quality of Life (LVQOL) questionnaire and the Vision-related Quality of Life Core Measure (VCM1) are two of the many vision-related quality of life (QOL) questionnaires that have been developed in recent years. Although psychometric properties of the LVQOL and VCM1 compare well with other vision-related QOL questionnaires, construct and longitudinal validity have not been assessed (adequately). The purpose of this study was to examine the cross-sectional and longitudinal construct validity of these questionnaires by testing specific pre-specified hypotheses about the relations of these questionnaires with other measures. The percentage of hypotheses regarding the cross-sectional construct validity that were refuted for the LVQOL was 22% for the basic aspects of vision subscale, 50% for the mobility subscale, 39% for the adjustment subscale and 17% for the reading and fine work subscale. For the VCM1 this percentage was 57%. For the longitudinal construct validity the percentage of hypotheses that were refuted ranged from 33 to 75% for the LVQOL subscales and was 50% for the VCM1. In conclusion, cross-sectional construct validity was satisfactory for the LVQOL subscales, but seemed poor for the VCM1. In addition, the longitudinal validity of these scales was poor to moderate.

Key words: Health-related quality of life, Questionnaires, Visually impaired persons

Abbreviations

CFA – confirmatory factor analysis; CFI – comparative fit index; CI – confidence interval; GRQ – global rating question; HAQ – Health Assessment Questionnaire; HRQOL – health-related quality of life; ICC – intra-class correlation coefficient; IQ – interquartile; SD – standard deviation; LVQOL – Low Vision Quality of Life questionnaire; QOL – quality of life; VCM1 – Vision-related Quality of Life Core Measure

Introduction

During the last decades increased attention has been paid to health-related quality of life (HRQOL) as an outcome measure in health-care [1–3]. Consequently, many questionnaires have been developed to assess this construct [1, 4]. The field of Ophthalmology is no exception in this respect [5, 6]. A recent review of vision-related quality of life (QOL) questionnaires describes 31 instruments. In addition, the review provides an evaluation of the psychometric properties of these instruments [5]. Two of the questionnaires included in the review are the Vision-Related Quality of Life Core Measure (VCM1) [7] and the Low Vision Quality of Life (LVQOL) questionnaire [8]. The psychometric properties of both questionnaires were shown to compare well to other
vision-related QOL questionnaires [5], but as is the case for the other questionnaires, these instruments need further testing in some areas. Among these areas are construct validity and responsiveness.

Construct validity deals with the question of whether the empirical findings correspond with theoretical expectations concerning the questionnaire. Hypotheses about relations with other measures or variables should be postulated [9]. These hypotheses should be both verifiable and challenging [5]. Common practice in the development and evaluation of the vision-related QOL questionnaires, including the VCM1 and the LVQOL, is that the scores on the questionnaires are correlated with other measures (mostly visual acuity and/or other vision-related QOL questionnaires) without postulating specific hypotheses [5]. Statistically significant correlations are often presented as evidence. However, the goal of construct validity is to examine if the associations you find are as you had expected (whether this is a statistical significant correlation or not) based on the theoretical knowledge available. This is not possible without postulating specific hypothesis [9].

Responsiveness is the ability of an instrument to measure real or important change over time in the concept being measured [10]. There is an ongoing debate in the literature about the definition and adequate approach for evaluating responsiveness [10–12]. In a recent review, Terwee et al. [10] have identified 25 definitions and 31 measures of responsiveness. They conclude that all measures of responsiveness can be looked at as measures of longitudinal validity or as measures of treatment effect. Measures of treatment effect such as effect sizes or the *t*-test statistic are in itself only useful for interpretation of score changes, not for assessing the responsiveness of a measure, because it will not be possible to infer if a corresponding change in the concept has taken place. For the assessment of responsiveness, the method of choice should be to assess longitudinal validity. This approach is similar to the approach used to assess construct validity, albeit that it deals with change scores instead of single scores. It should be noted that measures of treatment effect can be used to assess longitudinal validity when hypotheses about the expected treatment effect have been postulated.

Cross-sectional and longitudinal validity will usually be related, especially when using the same external measures in their evaluation. For example, when a substantial cross-sectional correlation between a vision-related QOL instrument and visual acuity is found, it can be expected that the change scores of the measures also show a substantial correlation. However, there are situations in which conclusions about cross-sectional validity might differ from those about longitudinal validity. For example, an instrument can validly measure a concept at one point in time, but may be unable to measure changes, because most of the patients are near the bottom or top of the scale (floor or ceiling effects). In case of a homogeneous population at baseline, one could also imagine a situation where there is longitudinal validity, but no cross-sectional validity [10].

For both the VCM1 and the LVQOL, cross-sectional construct validity has not been assessed properly and longitudinal validity has not been assessed at all. Therefore, the objective of the study was to assess the cross-sectional and longitudinal construct validity of the VCM1 and the LVQOL in a Dutch population of visually impaired elderly persons. The basic approach we used was to postulate specific hypotheses about the relations we expected between the VCM1 and the LVQOL and other measures (see Tables 1 and 2). Subsequently we tested whether or not we had to refute these hypotheses by relating the VCM1 and the LVQOL (change) scores with the (change) scores on the other measures in our data set (usually with correlations).

Methods

Design

The study population consisted of candidates for a one-year follow-up study on the outcome of low vision services on the quality of life of visually impaired older men and women. Measurements were taken at baseline, 1–4 weeks later (retest), five months later and a year later. For the present investigation, the baseline, retest and five month follow-up measurements were used.