

SHORT REPORT

Assessing Health-Related Quality of Life in Older Adults: EuroQol Five-Dimensional Questionnaire vs the Short Form Health Survey

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Abstract

This study analyses the association between EuroQol five-dimensional questionnaire indexes (utility index and visual analogue scale) and the physical and mental components of the Short Form Health Survey, considering the impact of some variables that may influence both questionnaires (i.e., age, BMI, physical fitness and cognitive function). Bivariate and partial correlation analysis between EuroQol five-dimensional questionnaire indexes and summary components of the Short Form Health Survey, including the mentioned covariates, were conducted in 58 older adults (71.03 ± 4.32 years). The large to small correlations found between utility index and the physical component (0.647), as well as the utility index and the visual analogue scale (0.441), persisted by adjusting physical condition, cognitive function, BMI and age, while mental components showed no association at all. The utility index and physical component were confirmed to correlate with physical fitness, although moderately (0.294; 0.284). BMI was negatively associated, but only to the utility index (-0.322). These results reinforce the concurrent validity only for the utility index and physical components and highlight the importance of physical fitness in a comprehensive geriatric assessment. The indexes of the Short Form Health Survey seem to provide diverse information regarding those of the EuroQol five-dimensional questionnaire in terms of the HRQL construct.

Keywords: aging, body mass index, executive function; health status; perceived quality of life; physical fitness

Introduction

The study of Health-Related Quality of Life (HRQL) emerges as an important objective of health promotion and disease prevention policies for older adults (OA) (Buchcik, Westenhöfer, Fleming, & Martin, 2017) arousing great interest for administrations and professionals in this field (Luthy, Cedraschi, Allaz, Herrmann, & Ludwig, 2015). As an example, the development of two common questionnaires: The Short Form Health Survey (SF-36) and the EuroQol five-dimensional questionnaire (EQ-5D); or more recently, the short version of the former (SF-12) and the subsequent update of the latter (EQ-5D-5L). These two questionnaires, designed to measure

HRQL regardless of the presence or absence of diseases, have become popular in OA studies (Hart, Kang, Weatherby, Lee, & Brinthaup, 2015). In addition, they have shown good reliability and validity in this population (Haywood, Garratt, & Fitzpatrick, 2005), despite its high heterogeneity and the many variables that influence the HRQL.

In recent years, it has been observed that people with better physical fitness (PF) are usually in higher percentiles in terms of perceived HRQL as assessed employing the EQ-5D (Wanderley et al., 2011), giving increasing importance to this domain. Other studies have confirmed that HRQL decreases as the Body Mass Index (BMI) and/or age increases (König et



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al., 2010; Korhonen, Seppälä, Järvenpää, & Kautiainen, 2014), using both the EQ-5D and the SF-12. It has even been found that cognitive function (CF), and more specifically executive functions, such as inhibition and cognitive flexibility, also influence the responses obtained in these questionnaires (Forte, Boreham, De Vito, & Pesce, 2015).

In this context, if PF, CF, age, and BMI confirm to modify the HRQL scores (utility index; visual analogue scale, physical components, and mental components), it seems useful to deepen in the concurrent analysis of these scores controlling the influence of each of the above-cited covariates. To the best of our knowledge, no studies have performed this type of analysis between the SF-12 and the EQ-5D-5L among a population of older adults. Thus, the aim of this study is to analyse the association between EQ-5D-5L and SF-12, considering the impact of some variables that may influence both questionnaires (i.e. age, BMI, physical fitness and cognitive function).

Methods

Participants

Fifty-eight elderly people (30 women) participated in this cross-sectional study. Inclusion criteria were: 1) to be over 60 years of age; 2) refer a score less than or equal to 2 in the fragility questionnaire of Fried et al. (2001); 3) not to participate in any supervised physical activity prior to the evaluation.

HRQL Questionnaires

The EQ-5D-5L questionnaire (Herdman et al., 2011) has two parts: the EQindex (utility index), a descriptive profile that can be converted into an index-summary which defines health in terms of five dimensions (Mobility, Self-care, Daily Activities, Pain/Discomfort, and Anxiety/Depression); and the EQVAS, in which respondents rate their overall health using a vertical visual analogue scale from 0 to 100.

The SF-12 (Ware, 2002) is a reduced and updated version of the SF-36 questionnaire, designed for quick administration. It answers 12 questions (on a Likert scale of 2 or 6 points) that add up to eight dimensions, in which two summary components are obtained: the physical component (PCS) and the mental component (MCS) (Ware, 2002).

Covariates

PF was obtained from the average of the standardized values of three well-known tests: the Five-Times-Sit-to-Stand Test (5STS), as a measure of lower-limb strength (Whitney et al., 2005); the 6-minute walk (6MWT), as a measure of the cardiovascular fitness; the six-metre Gait-Speed (GS_{6m}), to assess the overall functional capacity. The 6MWT was conducted following the recommendations of the American Thoracic Society (2002). The GS_{6m} was evaluated using Cronojump Bosco System electric photocells (Velleman PEM10D photocells, 5-100ms response time) and the Chronojump Software.

In contrast, after assessing weight (BC-545 scale; TANITA; Tokyo, Japan) and height (SECA 222 stadiometer), BMI was calculated as body weight divided by the squared value of body height (kg/m²). CF was assessed with the Stroop Test, in which the interference score was calculated as a representative value of the Executive Function (Rivera et al., 2015).

Experimental procedure and ethical aspects

Data collection was carried out on two alternate days to control the contaminating effect of some tests. On the first day,

we assessed body composition, SF-12, EQ-5D-5L, and the 5STS test; on the second day, Stroop Test, 6-metre Gait-Speed, and the 6MWT were assessed. Food intake was halted two hours prior to the assessments. All individuals were previously informed and signed their written consent to participate in this study approved by the ethic committee of the University of Valencia.

Statistical analysis

Data were analyzed with the Statistical Package for the Social Sciences, SPSS v24 for Windows (IBM Inc. Chicago, USA). After testing for normality, non-parametric correlation analysis (Spearman's Rho) were conducted between the main HRQL indices (EQindex, EQVAS (visual analogue scale), PCS (physical components) and MCS (mental components), followed by partial correlation analysis controlling the covariates PF, EF, Age and BMI. It was considered: $r < 0.1$, trivial; $0.1-0.3$, small; $0.3-0.5$, moderate; $0.5-0.7$, large; $0.7-0.9$, very large; > 0.9 , almost perfect; and 1 perfect.

Results

The sample was relatively homogeneous in terms of age (71.03 ± 4.32 years; 6.1% CV), with a larger coefficient of variation in weight (71.15 ± 14.27 kg, 20% CV), BMI (29.10 ± 4.21 ; 14.5% CV) and the interference score of executive function (-6.02 ± 7.90 ; CV=130.8%).

Bivariate correlations

Our results confirm a positive and moderate correlation between the components of the EQ-5D-5L (EQindex vs EQVAS; $r = 0.441$, $p < 0.05$), not found between the summary components of the SF-12 (PCS vs MCS; $r = 0.036$; $p > 0.10$). Moreover, when analysing the concurrence between questionnaires (figure 1), the PCS confirmed a large and positive concurrence with EQindex, and a trend regarding the EQVAS (small), while the MCS failed to associate with any index of the EQ-5D-5L.

Partial correlations

Regarding the influence of PF, CF, age, and BMI on these relationships, once checked whether there were changes in partial correlations for each covariate or groups of covariates, Figure 1 shows these results both independently as when controlling the four covariates together. PF correlates significantly and positively with EQindex and PCS, while BMI only affects EQindex. Partial correlation coefficient decreases slightly in comparison to the previous analysis, with no difference in levels of significance. Significantly, MCS again failed to relate with any covariate. Neither age nor CF showed any association at all.

Discussion

The present study aimed to highlight similarities and differences between two questionnaires widely used in the assessment of the health-related quality of life among the elderly, sorting out the influence of physical and mental conditions related to age. As the main finding, both questionnaires share and properly highlight the importance of the PF in elderly people's HRQL. PF is highly associated with the EQindex and PCS, which are also largely associated with each other. Conversely, EQVAS and MCS fail in these associations, which indicates their complementarity and need in the assessment of this construct (HRQL).

Similar to previous studies (Dritsaki, Petrou, Williams, &

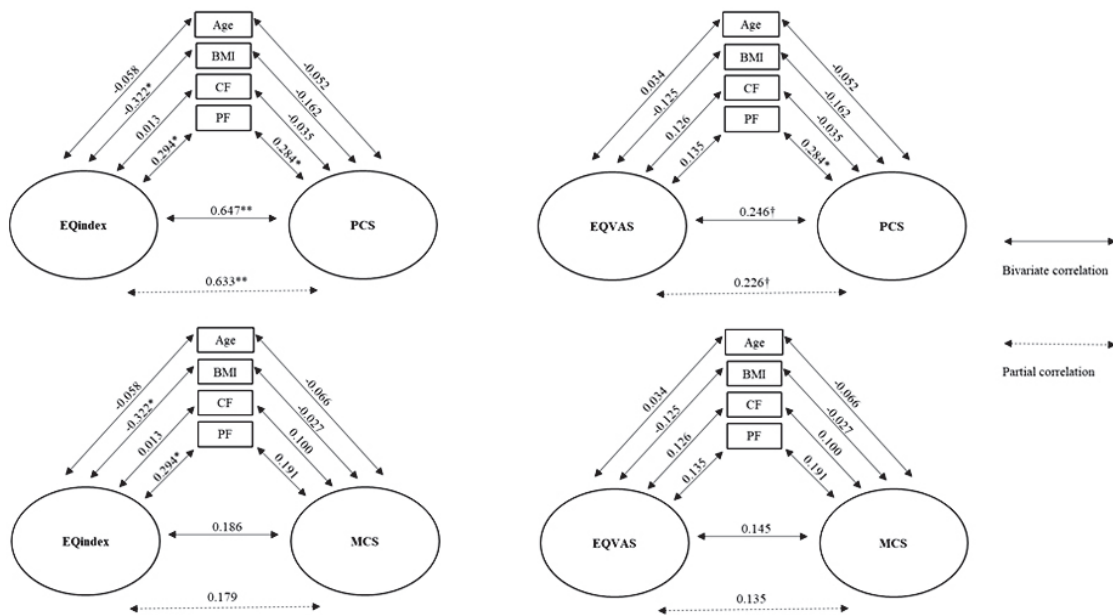


FIGURE 1. Bivariate and partial correlations (Spearman) between the different HRQL indices when controlling physical fitness, cognitive function, body mass index and age together, ** $p < 0.010$; * $p < 0.050$; † $p = 0.100$.

Lamb, 2017), our results reinforce the concurrent validity of both questionnaires in terms of perceived physical health and its influence on the quality of life (EQindex and PCS), qualifying them in relation to a population of older adults. However, data also confirm the need for both instruments and the influence of other factors different from the physical health in the HRQL. The summary components of the SF-12 do not correlate between each other, and the within correlation in the two EQ-5D-5L indexes decreases. In addition, the EQVAS-PCS correlation is only a trend, and the MCS does not correlate with any of the EQ-5D-5L indices. Indeed MCS seems to provide information about a different theoretic construct to which the rest of the indices, not even affected by the age and Execute Function of the participants.

On the one hand, the association of PF and the components EQindex and PCS in both questionnaires reinforces the idea of a higher fitness leading to higher HRQL, as previously reported in older adults (Takata et al., 2010), PF should be included in the comprehensive geriatric assessment (Sánchez, Formiga, & Cruz-Jentoft, 2018) and taken into account in the assessment of HRQL. On the other hand, our data suggest that PF might influence this HRQL more than other factors such as BMI, age or the cognitive function in healthy older adults, at

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Conflict of interest

The authors declare that there is no conflict of interest.

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least in a sample quite homogeneous in terms of age.

With regard to BMI, only the EQIndex has been sensitive to this factor, reporting a small and negative association (Figure 1). Significantly, the use of the BMI may not fully reflect changes in body composition with ageing, as it does not distinguish between muscle mass and fat mass (Kahn & Cheng, 2018). Nevertheless, the EQindex may offer additional information related to being overweight by including some emotional issues (i.e., pain and anxiety), becoming a more comprehensive HRQL index.

Sample size and homogeneous age can be the major limitations of this study. Similarly, future studies should replicate this analysis by using, for example, the waist/hip ratio index, or more accurate tests for the cognitive domain. They should also investigate whether PF is best expressed by a unified set of variables under a single indicator, or by the isolated study of the different capacities of the OA, since the use of a single indicator could be hiding the relevance of some specific capacity.

In conclusion, our results indicate that only EQindex and PCS have moderate concurrent validity. However, controlling certain aspects such as PF, age or BMI is important due to their possible influence on certain indexes and their relationship.

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