Health-related quality of life in elderly: a review of the EQ-5D use

Qualidade de vida relacionada à saúde em idosos: uma revisão do uso do EQ-5D

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ABSTRACT

Objective: To systematically identify and review studies that used EQ-5D to assess health-related quality of life (QoL) in elderly. **Methods:** Relevant literature was searched in MEDLINE and Lilacs databases and the EuroQol Plenary Meetings Proceedings (June/2003 to June/2013). The inclusion criteria were subjects aged 60 years or more and the use of the EQ-5D questionnaire. Two independent reviewers screened title, abstract, full text and performed data extraction. The country where the study had been conducted, demographic characteristics of the population, objectives, common criteria used by the studies to the exclusion of patients/participants and presentation of the data were the variables analyzed. **Results:** A total of 90 studies were included with 34,449 subjects, the mean age was 75.6 ± 4.3 years. The majority of the studies were from Europe (66.7%). Studies in Africa and South America were not identified. The main diseases investigated were orthopedic (20.0%) and cardiovascular diseases (15.5%). The study's results were most frequently based on personal interviews (41.1%) involving directly the elderly (92.2%). The most common exclusion criteria were health conditions that could result in bias or confounding on the study protocol (61.1%) and low cognitive level (50.0%). The EQ-5D results were presented in different ways: means (82.2%) or medians (5.6%) associated with measures of dispersion as standard deviation (61.1%) and confidence interval (22.2%), or according to the answers in the descriptive system (22.2%). **Conclusions:** The lack of standardization in the exhibition of the results limits a direct comparison among different interventions.

RESUMO

Objetivo: Identificar sistematicamente e revisar os estudos que utilizaram o EQ-5D para avaliar a qualidade de vida relacionada à saúde em idosos. **Métodos:** Foram realizadas buscas nas bases MEDLINE e Lilacs e nos arquivos do encontro anual do grupo EuroQol (Junho/2003 a Junho/2013). Os critérios de inclusão dos estudos foram: população com idade ≥ 60 anos e uso do questionário EQ-5D. Dois revisores independentes avaliaram os títulos, depois os resumos e o texto completo e extraíram os dados. As variáveis estudadas foram: país de origem do estudo, características demográficas da amostra, objetivos do estudo, critérios para a exclusão dos pacientes e forma de apresentação dos resultados. **Resultados:** Foram incluídos 90 estudos, totalizando 34.449 indivíduos, cuja média de idade foi de 75,6 ± 4,3 anos. A maioria dos estudos foi conduzida na Europa (66,7%). Não foram identificados estudos na África ou na América do Sul. As principais doenças investigadas

foram ortopédicas (20,0%) e cardiovasculares (15,5%). Os resultados dos estudos basearam-se frequentemente em entrevistas presenciais (41,1%) realizadas com o próprio idoso (92,2%). Os critérios de exclusão mais comumente utilizados foram condições de saúde que poderiam inserir viés ou confundimento durante o estudo (61,1%) e baixo nível cognitivo do paciente (50,0%). Os resultados do EQ-5D foram apresentados de diferentes maneiras: médias (82,2%) ou medianas (5,6%) associadas com medidas de dispersão, como desvio-padrão (61,1%) e intervalo de confiança (22,2%), ou distribuição das respostas no sistema descritivo (22,2%). **Conclusões:** A ausência de padronização na apresentação dos resultados limita a comparação direta entre diferentes intervenções.

Introduction

The population aging is a worldwide phenomenon. In developing countries this process is occurring faster than it did in developed countries. In Brazil, the change of the population's proportion aged 60 years or over from 7% to 14%, took only 21 years, while in France, for example, it took 115 years. According to predictions, the Brazilian elderly population will experience a growth, rising from 14 million in 2000 to 58 million in 2050 (United Nations, 2013). A question that rises from this challenging reality is whether the increase in life expectancy might result in more years with good health or in more years with disability and dependency (United Nations, 2013). Thus, it is essential to improve functional independence and health-related quality of life for older adults.

The EQ-5D-3L is a generic instrument, applicable to different conditions and treatments. It comprises five dimensions, including mobility, personal care, day-to-day life, pain/discomfort and anxiety/depression. Each item has three levels of severity: no problems, some problems or extreme problems. The EQ-5D is used in more than 150 countries (EuroQol, 2016). It has been widespread used as it is simple to apply, to define score and easy to interpret (Dyer *et al.*, 2010). The EQ-5D questionnaire can be applied in face-to-face interviews, by phone, as an internet tool or by mail (EuroQol, 2016). This instrument is also used for clinical and economic evaluation as it is possible to convert self-classification responses into a single index score (Dyer *et al.*, 2010).

Besides the EQ-5D descriptive system, the EQ-5D instrument also counts with a visual analogue scale (EQ-VAS). This scale is similar to a thermometer, in which the extremities, 0 and 100, are labeled as 'Worst imaginable health state' and 'Best imaginable health state', respectively. The responder is asked to indicate a point on the scale that represents their self-rated health. The information obtained by EQ-VAS can be used as a quantitative measure of health outcome based on the judgement of the individual responders (Van Reenen e Oppe, 2015; EuroQol, 2016). Even though this questionnaire is widely used to assess quality of life in elderly, its use in the general population has not been analyzed by a systematic review that includes observational studies, in order to describe the global experience of collecting QoL data in elderly.

The primary goal of this systematic review is to present the synthesis of the use of EQ-5D 3L and 5L in elderly, independently of the type of intervention, comparator, disease or outcome studied through the scientific literature. In addition, this study has also shown the reply for the following questions:

• What diseases are being addressed by studies using the EQ-5D in elderly?

• Are there diseases whose health related quality of life of older people were not well represented by the EQ-5D?

• How the quality of life data are being extracted and described in these studies?

• Who are the subjects that are asked to reply the questionnaires? Are they health professionals, healthy people, patients, or their caregivers?

• Is there a difference in the perception of quality of life of older people when caregivers or health professionals answer the EQ-5D questionnaire?

Methods

Data collection and assessment

We searched MEDLINE and Lilacs databases and the EuroQol Plenary Meetings Proceedings, published between June/2003 and June/2013. The search strategy included the following terms: Elderly OR older OR octogenarian OR nonagenarian OR long term AND EQ-5D. Restrictions were not placed on publication dates.

Publication languages considered to this review were English, Portuguese, Spanish and Italian. Inclusion criteria were people aged 60 years or more and the use of the EQ-5D questionnaire. Table 1 shows the eligibility criteria used to define the Mesh terms of the search strategy.

Two independent reviewers (CM and BM) screened title, abstract and full text, and performed data extraction. Any disagreements among reviewers were assessed by a third reviewer (MS). A form had been developed to extract the following variables: the country where the study had been

Table 1. Eligibility criteria according to PICOS suggested structure

Criteria	Description
Population	Elderly (60 years or more)
Intervention/Comparison	-
Outcomes	Quality of life, utilities
Study design	Systematic review, randomized clinical trial, cohort study, cross-sectional study, case series study

conducted, demographic characteristics of the population, objectives, type of QoL questionnaire applied, common criteria used by the studies to the exclusion of patients/participants and presentation of the data. The data extraction has been done by two independent reviewers (CM and BM) and reviewed by a third investigator.

Results

A summary of the electronic search of databases is shown on Figure 1. There are 826 records. Based on the selection criteria, there were 110 articles, out of the total. After the assessment of the full-text articles, a total of 90 studies were included. The included articles involved 34,449 subjects and the mean age was 75.6 ± 4.3 years.

Place of origin
Most of the studies were from Europe (66.7%). Some studies were conducted in the United Kingdom (20 articles) and Spain (14 articles). The studies conducted in North America represented 14.4% of the total (5 from Canada and 8 from USA), and were followed by articles published in Asia (7.8%) and Oceania (6.7%). The other studies were conducted in more than one continent, as were conducted in countries in which borders belong to two different continents, such as Turkey and Indonesia (2.2%) or countries from different continents that established a scientific collaboration (2.2%). Studies from Africa and South America were not identified.

Application
Overall, most of the studies identified were carried out using patients' populations in patient samples (75.6%). The diseases most frequently investigated were the orthopedic ones (20.0%), including falls, fractures and spinal/back problems. Cardiovascular diseases were investigated in 15.5% of the studies, closely followed by common psychiatric disorders (11.1%), that included anxiety or/and depression (2.2%); 12.2% of the studies explored the impact of hospitalization or institutionalization of patients. Studies that focused on more than one health problem represented 8.9% of records in-
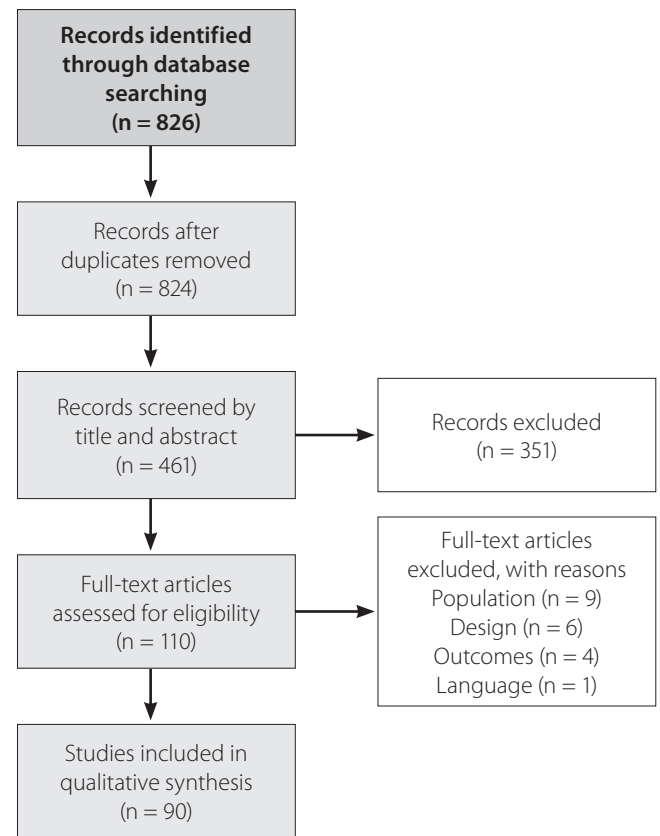

Figure 1. Flow diagram of studies selection.

cluded. They were classified as "other health problems" issues and not much addressed by authors. It represents 8.9% of the studies (cancer, menopause, chronic pain, herpes zoster, hearing problems and oral health). Other common diseases in the elderly have not been much addressed, such as cataract (3.3%), obesity and nutritional status (3.3%) and diabetes (2.2%).

Responders
In most studies (92.2%), elderly responders were asked to self-report on their health status. In other studies the assessment of the HRQOL was provided by caregivers or/and physicians. Thereabout 13.3% of the studies investigated had exclusively women. In 16.7% of the surveys that included healthy elderly from general population and investigated predictors of quality of life, it was observed some kinds of physical training to avoid falls and others issues.

Exclusion criteria
The most common exclusion criteria reported in the studies were clinical and dependency of a medical decision to identify the presence of some comorbidity, terminal illness or other health conditions that could result in bias and/or confounding on the study protocol (61.1%). The presence or suspicion of cognitive impairment was another important reason for

exclusion (50.0%). The exclusion criteria had not been clearly addressed in certain studies (12.2%), and others had been excluded due to the missing data (5.6%) and others reasons (14.4%).

The definition of low cognitive level/cognitive impairment varied across the studies. In order to include patients in their study, Borowiak and Kostka (2006) considered a need of "verbal communication efficiency" (Borowiak and Kostka, 2006). Another studies had excluded patients when they could not understand the informed consent (Coast *et al.*, 1998; Keating *et al.*, 2005), generic simple tasks (Coleman *et al.*, 2012; Houlind *et al.*, 2012) or instructions related to the study protocol (Azpiazu Garrido *et al.*, 2003; Feo *et al.*, 2003; Kerse *et al.*, 2008; Lee *et al.*, 2013). Datta (2008) did not include subjects with "memory problems preventing completion of questionnaires" (Datta *et al.*, 2008). Some authors did not consider elderly with diagnosis of severe dementia (Borowiak and Kostka, 2004; Kostka and Bogus, 2007), dementia (Ryan *et al.*, 2006; Gusi *et al.*, 2008; Fusco *et al.*, 2011) or "severe psychiatric diseases" (Varas-Fabra *et al.*, 2006). Gusi & Cols (2008) also excluded patients with "attention or comprehension problems as Alzheimer's disease, apraxia, global aphasia, and other types of dementia or psychopathology (Gusi *et al.*, 2008). Sacanella & Cols (2011) and Jonkers & Cols (2009) did not define cognitive impairment or severe cognitive impairment, respectively, but excluded these patients (Jonkers *et al.*, 2009; Sacanella *et al.*, 2011).

Some studies applied the Mini Mental State Examination (MMSE) to measure cognitive function (18.9%), considering scores lower than seven (5.9%), 19 (5.9%), 20 (5.9%), 24 (76.4%) as cut-points for exclusion or did not establish a cut-point for exclusion (5.9%). There are two studies that also included mildly impaired patients (MMSE score 16-23) who had a caregiver (11.8%).

Other instruments had also been used to assess cognitive impairment: The Informant Questionnaire on Cognitive Decline short form (IQCODE-SF), a test that evaluates a spectrum of cognitive decline, based on responses of an informant who has known the patient for at least 10 years (De Rooij *et al.*, 2008); Groningen 15 Words test and the Trails B test (Jacobsen *et al.*, 2012); Pfeiffer's Short Portable Mental Status Questionnaire (Azpiazu Garrido *et al.*, 2002; Azpiazu Garrido *et al.*, 2003; Tidermark e Ponzer, 2003; Cai *et al.*, 2012; Fernandez-Martinez *et al.*, 2012); the clock drawing test used by Gjertsen (2010), who included cognitive impaired patients. This test has been reported to have good correlation with the Mini-Mental State Examination and is quick and easy to administer (Gjertsen, 2010).

EQ-5D
The studies estimates were largely based on face-to-face interviews (41.1%). Some authors chose to report clearly that the questionnaire had been self-completed (21.1%). The questionnaires were also administered by mail (8.9%) and by phone (4.4%). Other studies had not been straight about the way the questionnaire was administered (15.6%).

The EQ-5D results were presented in a range of ways, such as: means (82.2%), medians (5.6%) or means/medians associated with measures of dispersion as standard deviation (61.1%) and confidence interval (22.2%) or according to the answers in the descriptive system (22.2%). Not all studies used the visual analog scale, which is a second part of the EuroQol questionnaire (38.9%).

Discussion

One important rationale for the systematic review is the feasibility of application of EQ-5D for elderly. Although it's a popular instrument, EQ-5D has limited use in geriatric field, especially in Latin America and Africa. A EQ-5D tariff had not been available in Brazil until recently, then it is plausible that no studies were carried out in this country (Santos *et al.*, 2016). Considering that the Brazilian elderlies' illiteracy reaches 26,5%, which is higher in poor municipalities (IBGE), it brings to the attention that there are no reports/the absence of reports on this issue. The availability of a visual version of EQ-5D will enable that elderly who have low education can be evaluated, especially in Latin America and Africa.

The EQ-5D is applied to a range of health conditions for the elderly, as it is also applied in the general population. The easy application of EQ-5D is its main advantage. This perception is confirmed by many authors studied (Hage *et al.*, 2003; Austin *et al.*, 2005; Grace *et al.*, 2007; Austin *et al.*, 2009). The EQ-5D applicability to specific diseases is controversy. The reasons for the debate are based on the fact that some researchers consider that generic instruments are less sensible to changes over time (Hage *et al.*, 2003; Vuorialho *et al.*, 2006; Datta *et al.*, 2008) and to recommend the use of specific tools to evaluate certain diseases (Hage *et al.*, 2003). Another authors have confirmed the reliability of this instrument to evaluate specific health conditions (Jakola *et al.*, 2010; Davis *et al.*, 2012).

Another controversial issue is the interpretation of the health related quality of life (HRQL) outcomes. Although the changes in HRQL scores are statistically significant, it may have no or limited clinical importance for the patient (Degl'innocenti *et al.*, 2004). It is possible that it occurs because of the nature of the concept. Quality of life is based on a personal perception of one's own health status (Fusco *et al.*, 2011). Despite this fact, Rolfson *et al.* (2016) identified that EQ-5D has a clear potential for application for measure of clinical impact of interventions in the elderly (Rolfson, 2016). There are some studies mentioned in this review that have attempted to establish a minimally important difference be-

tween the EQ-5D index score and the EQ-VAS, in order to indicate a minimal perceptible clinical improvement, although no consensus has been achieved (Hardy *et al.*, 2007; Gjertsen, 2010; Viccaro *et al.*, 2011).

In fact, the clinical impact of the measures taken with the EQ-5D should rely on many characteristics of the person who have replied the questionnaire. There is evidence that men report a better quality of life compared to women (Ferrer *et al.*, 2010; Fortuño Godes *et al.*, 2011; Fusco *et al.*, 2011; Fernandez-Martinez *et al.*, 2012; Kim *et al.*, 2012). On the other hand, there are studies that did not show this difference (Degl'innocenti and Olofsson, 2002; Ferrer *et al.*, 2011) or suggested that if the gender is combined with other factors such as economic condition, depression or disability, then it cannot have causality in self-perceived health status (Fernandez-Martinez *et al.*, 2012).

The achievement of quality of life measures in patients with cognitive problems is a major challenge that has been shown by this study. The vast majority of studies excluded these patients from their analyses and, when this does not occur, there are uncertainties regarding the use of EQ-5D for these patients. For some authors, the fact that EQ-5D does not directly measure cognition should interfere (Bryan *et al.*, 2005; Davis, 2010), others authors focus the discussion on the capacity of these patients to asses health-related quality of life using the EQ-5D instrument (Coucill *et al.*, 2001; De Rooij *et al.*, 2008; Gjertsen, 2010). There is a need for new research on the evaluation of the level of dementia that patients would become unable to reply the questionnaire.

The uses of *proxies* (filling out the questionnaires by caregivers or doctors) for cognitive impaired patients had been discussed in some studies, included in this review. There are differences between the assessments done by the patients and those done by their relatives/caregivers or clinician (Coucill *et al.*, 2001; Bryan *et al.*, 2005; Gjertsen, 2010). In a study with 64 patients with dementia, the overall valuation EQ-5D scores based on clinicians' answers was significantly higher than the score based on caregivers evaluation, and it was found more correlation clinician-patient for mobility and safe care (more observable dimensions) and caregiver-patient for usual activities and anxiety/depression (subjective dimensions) (Bryan *et al.*, 2005). Although Blomfeldt *et al.* (2005) observed low correlation between caregiver-patient for pain and anxiety/depression, they stated that the use of *proxies* is the only way to assess the HRQOL for cognitive impaired patients. Besides all this debate over the use of *proxies*, some authors also discusses the way the questionnaire is applied. The usual application for EQ-5D is a self-completed questionnaire, but in elderlies, especially those with low education level, is often necessary to have an interviewer support (Coast *et al.*, 1998; EuroQol, 2016).

Although the user guides of EQ-5D recommends a standard presentation of data (Van Reenen e Oppe, 2015), there had been much discordance in our results. Some studies do not have the score in the form of utilities and show the results as a mean calculated, according to the participant's response (EQ-5D sub dimension scores: 1 = no problem, problem 2 = some, 3 = major problem) (Tidermark *et al.*, 2003; Grace *et al.*, 2007; Biçer *et al.*, 2009). There is a need to review the process ensuring to present EQ-5D-3L results according to the user guides of EQ-5D (Van Reenen e Oppe, 2015).

The broad spectrum of the review questions and the fail on presenting data by the researches precludes the extraction of utilities values, considering that the purpose of this review is to identify the state of the art with regard to trials that use EQ-5D in the elderly population.

Conclusions

The main limitation of the present study was to extract and standardize the data referring to EQ5D, since the primary studies do not present them in a standardized way.

This limits the direct comparison between different interventions. The researchers and the Journal´s editors should follow the instructions of EQ-5D guideline, in order to present the EQ-5D results and to enable a comparison among different diseases.

In general, there is much disagreement in the literature regarding the standard of the EQ-5D that must be applied and its use for specific health conditions, in contrast to the use of specific tools. Finally, it is also necessary to produce more studies that assess the level of understanding presented by elderly, regarding EQ-5D when compared with other instruments. In our review, few trials have addressed these issues. Most authors only considered the EQ-5D questionnaire as an useful and practical tool in a general manner.

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