Characteristics of instruments of functional assessment in the elderly persons living within the community in Brazil

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ABSTRACT

Background: Independence level of elderly persons is highly associated to the ability to overcome deficits in cognition, humor, mobility and communication capacity domains and can be measured by instruments which appraise need of help to perform daily living activities. Objective: To assess characteristics of the Brazilian version of Older Americans Resources and Services Multidimensional Functional Assessment Questionnaire (BOMFAQ) and the version in Portuguese of the Health Assessment Questionnaire (HAQ) to identify functional dependency. Methods: Cross-sectional study of a random sample of community-dwelling older people (aged 60 and over) in Ouro Preto, 2002. The elderly people with “much difficulty” or “unable” to perform at least one activity of daily living were considered dependent. The causes of dependence were grouped into the following domains: mobility, mental health, sense organs according to medical examination and weight gain. Statistical analysis was made through the Chi-square test. Results: 102 elderly persons were assessed through medical examination, with 89 of them classified as dependent and 13 as controls, i.e., independent. The HAQ and the BOMFAQ presented sensitivity of 58% and 83%, specificity of 85% and 69%, positive prediction values of 79% and 73% and negative of 67% and 81%, respectively. The HAQ showed good sensitivity, specificity and prediction values to identify dependency in the mobility domain. The BOMFAQ demonstrated good or excellent sensitivity, but low specificity and positive prediction values in every domain. The tests presented good intra-observer accuracy, but low inter-observer accuracy. Conclusion: The HAQ is adequate for identifying functional dependency in the mobility domain in a general population of elderly persons. Due to its low specificity, the BOMFAQ can overestimate the prevalence of dependency. Low inter-observer accuracy must be considered in the planning of the studies that use these instruments. Key words: Elderly, functional assessment, dependency, Health Assessment Questionnaire, Brazilian version of the Multidimensional Functional Assessment Questionnaire.
The concept *healthy aging* is no longer understood as the absence of diseases, but as the success in overcoming them through selective, adaptive and compensatory mechanisms, in order to maintain the highest possible level of functional capacity. In these terms, the maintenance of independency is intrinsically associated with the overcoming of deficits in the domains of cognition, humor, mobility and capacity of communication. Whether it is in the research setting or in clinical practice, the level of independency of elderly people to perform daily activities can be rated through instruments that assess their need for help in the performance of simple tasks (basic activities of daily living – BADL) and more complex tasks that enable their living in the community (instrumental activities of daily living – IADL). It has been proved that the functional decline of older people generally complies with a hierarchy. Thus, at first, they stop performing the most complex tasks (such as making phone calls or going shopping) and, progressively, they stop with the most simple ones (taking a shower, feeding themselves).

Although many assessment instruments of the functional status have been used in Brazilian epidemiologic studies, they were not formally adapted to the Portuguese language or tested for validity and reliability, thus compromising the investigation process.

The Health Assessment Questionnaire (HAQ) is a multidimensional instrument that developed the *discomfort* and *physical incapacity* sections. The latter evaluates the level of the individual’s difficulty to perform BADL and IADL during the last week. The HAQ was adapted to Brazil in a study done with the population with rheumatoid arthritis. In this study, coefficients of reliability, validity and semantic aspects of the adaptation for the Brazilian context are mentioned. The HAQ is useful in the clinical practice and in epidemiologic inquiries: its reliability and validity are classified as “very good”.

By adapting the *Older Americans Resources and Services* (OARS) *Multidimensional Functional Assessment Questionnaire* (OMFAQ) to Portuguese, the BOMFAQ (Brazilian version of OMFAQ) was developed. It is a multidimensional instrument, restricted to epidemiologic inquiries. This instrument has been used in several Brazilian studies. There are sections concerning physical and mental health, usage of health services, social and economic resources and capacity to perform BADL and IADL. Although the original instrument has adequate validity and reliability, studies have not been found regarding the validation or reliability of the test in its integral form, only validating the mental health section.

Based on considerations of the above facts, the objective of this study was to assess the intrinsic quality (sensitivity and specificity) and the usefulness to produce clinical decisions (positive prediction value – PPV and negative prediction value – NPV), in addition to the agreement, the BOMFAQ’s functional assessment section and the Brazilian version of the HAQ, specifically in regards to the four domains associated with the presence of dependency: mobility, mental health, sense organs (sight, hearing) and weight gain.

**MATERIALS AND METHODS**

**Design and population:** This study was associated with another about cardiovascular diseases prevalence in Ouro Preto, a historical city in the Southeast region of Brazil. The study was approved by the Research Ethics Board.
of the Federal University of Minas Gerais and Federal University of Ouro Preto. All individuals aged 60 or more, 198 individuals, were invited for the assessment. Of these, five refused to participate, 12 were excluded, and two died. Before the beginning of the assessment, the informed consent and the dementia screening were conducted using a specific instrument, The Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE). The complete questionnaire was repeated in 77% of the initial sample (179 elderly persons) and the intra- and inter-observer reliability was analyzed in those cases where the repetition occurred in fewer than three months. Validity indexes of two screening dependency instruments to perform activities of daily living were estimated after performing the geriatric clinical examination, considered here as a gold standard. After assessment by the gold standard, out of 102 individuals from the sample (57%), 89 cases and 13 controls were identified. This assessment includes semi-structured interviews for details of the dependency, with questions on the incapacity for independent accomplishment of the BADLs and IADLs, the onset of dependency, possible causes and intensity with direct observation (performance test) and use of specific instruments, when necessary, for cognitive assessment (IQCODE), depression (Geriatric Scale of Depression – GDS) and mobility (qualitative Get up and go), in addition to physical examination.

Assessment instruments: Dementia screening was performed, at first, by the IQCODE, a version with seventeen questions, which investigates current cognition characteristics and compares them to those from ten years ago. The IQCODE is not influenced by education level and must be answered by an informant who has lived with the older person for at least ten years. In cases of negative screening, the older person generally answer the HAQ and BOMFAQ questions by themselves. In cases of positive screening, the companion participated in the interview. The questions were classified in 4 categories of difficulty to perform the tasks by themselves.

Regarding the use of instruments, the HAQ and BOMFAQ combined a multidimensional questionnaire, applied by researchers with education in gerontology, previously trained, and whose reliability of the interviews showed to be satisfactory in a pilot study. The interviewers did not know the criteria for the definition of case of the study’s functional dependency.

Definition of cases: Cognitive deficit – Older people with a mean of ≤ 3.4 in the IQCODE were considered negative for the dementia screening and those with a mean of ≥ 3.7 were considered positive. In cases of scores between these values, older people with a mean of ≥ 3.5 in those two questions of highest discriminatory power were considered possible cases. Functional dependency – The individuals with much difficulty or unable to do one or more BOMFAQ or HAQ’s tasks were considered cases. Comorbidities – During the assessment by a geriatrician, diseases and conditions associated with functional incapacity were grouped in four domains: a) mobility (osteoarticular diseases and the motor sequels of cerebrovascular, cardiorespiratory or neoplastic diseases); b) mental health (cognition and humor), c) sight and/or hearing, and d) heavy weight gain (self-reported by the elderly patients). Some older people were considered dependent in more than one domain.

Statistical analysis: The Statistical Package for Social Sciences – SPSS, version 12.0, was used in the descriptive statistics of the sample distribution according to demographic characteristics and presence of dependency to perform basic or instrumental activity of daily living. The initial analysis through the pondered Kappa statistics was obtained to assess the questionnaires’ reliability. Validity indexes (sensitivity, specificity, predictive value and Youden’s agreement) were used for the comparative analysis of the screening instruments. The geriatrician’s medical examination was considered the reference (gold-standard?). Significant differences were determined by McNemar’s Chi-square test. Measures of sensitivity, specificity and prediction values between 70% and 84% were considered “good”; and from 85% above, “excellent”.

RESULTS

Out of the 179 elderly persons assessed by the screening instruments, 137 had their questionnaires repeated. Out of these, 36 elderly persons (26.3%) changed the diagnosis of functional dependency according to the HAQ, and 31 elderly persons (22.6%) according to the BOMFAQ.

From the 20 items in the HAQ, the intra-observer reliability was higher than 80% for 18 items and the inter-observer for 14 items. From the 15 items in the BOMFAQ, the intra-observer accuracy was higher than 80% for 11 items and the inter-observer accuracy for 10 items. The intra-observer correlation coefficient kappa was ≥ 0.8 in 95% for the items in the HAQ (p = 0.01) and in 87% for the items in the BOMFAQ (p = 0.02).

Through the geriatric examination, 89 elderly persons were classified as dependent and 13 as control. Differences between dependent and control regarding age (69 years old x 67 years old), proportion of women (80.9% x 61.5%), non-white (70.1% x 61.5%), from low economic class (65.9% x 41.7%), average years of schooling (3.7 x 2.9) were not statistically significant (Table 1).
was mobility (68.6%), followed by mental health (34.3%), weight change (30.4%) and sense organs (12.7%). The total (n=149) surpasses the 89 elderly people classified as dependent because some were included in more than one domain. Among the dependent patients in the mobility domain, according to the medical examination, the HAQ identified more cases than the BOMFAQ (this difference is not statistically significant). The opposite occurred in relation to the other three domains.

The HAQ presented good sensitivity and specificity to identify dependency in the mobility domain, generating adequate prediction values, which did not occur with the other domains. The BOMFAQ showed good or excellent sensitivity to identify dependency in every domain. However, the specificity was very low, generating low positive prediction values for all domains, and adequate negative prediction values for the mobility and mental health domains.

All elderly people, whose answers were it does not apply, were men, answering items regarding domestic duties (e.g., “house cleaning”). Two dependency cases according to screening and the geriatrician examination (“cutting toe nails”) did not correspond to any domain.

Taking into consideration the prevalence of physical, mental, sight and hearing deficiency in elderly people in Brazil\(^1\), we calculated the HAQ and BOMFAQ’s sensitivity, specificity and prediction values (Table 2).

According to the medical examination (Table 3), the domain that demonstrated highest independency was mobility (68.6%), followed by mental health (34.3%), weight change (30.4%) and sense organs (12.7%). The total (n=149) surpasses the 89 elderly people classified as dependent because some were included in more than one domain. Among the dependent patients in the mobility domain, according to the medical examination, the HAQ identified more cases than the BOMFAQ (this difference is not statistically significant). The opposite occurred in relation to the other three domains.

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DISCUSSION

The most reliable method for evaluating an elderly person's functional capacity is the direct observation of his/her performance (performance tests). But usage of such a method requires resources that are not always available.

The usage of adequate functional assessment instruments in population inquiries can support strategies for providing effective care for the elderly that privilege actions focused on the reality of this population group. In addition to this, these instruments could be very useful in general clinic settings as they provide reliable information about the functional status, obtained with objective questions included in the wide geriatric assessment.

For the general population assessed in this study, the BOMFAQ proved to be a better screening instrument (sensitivity = 83%, negative predictive value = 81%) than the HAQ (sensitivity = 58% and negative predictive value = 67%) for detecting a decrease in the functional capacity in the performance of daily life tasks. However, there are no publications from the BOMFAQ that present data about its validity and reliability, although it is widely used in Brazil. These findings must be confirmed by other studies since the HAQ's validation in Portuguese kept the same characteristics of internal consistency as the original version. Therefore, it is a reliable instrument, though used in this study's general population for the first time.

It is relevant to point out that the high values of prediction demonstrated by the tests lose importance when the validity characteristics in each dependency domain are assessed.

The HAQ showed to be adequate for dependency screening in the mobility domain, but not for the other domains. In fact, the HAQ was originally elaborated for the assessment of physical ability. In this research, it showed that the HAQ is capable of identifying other causes of reduction of the functional capacity, not just the ones that interfere in the mobility of elderly persons in spite of the BOMFAQ's being a more sensitive instrument for this purpose. The result of other studies done with the general population using these instruments could confirm these findings.

Concerning to BOMFAQ, this study suggests limitations regarding its usage for screening. In fact, the proportion of elderly persons classified as dependent by the BOMFAQ and as independent by the geriatrician in the same domain was very high. It is supposed that at the expense of very high sensitivity and low specificity, the BOMFAQ could overestimate the dependency of elderly persons in the population studies leading to incorrect conclusions about functional health and status.

Although the intra-observer agreement can be classified as substantial for 95% of the HAQ's items, and moderate and substantial for the BOMFAQ's items, the inter-observer agreement was mild to moderate for most of the items from both tests.

The fact that a high number of questionnaires had been repeated with intervals of approximately three months could justify the change in diagnosis, since practically 1 in 4 elderly persons had their classification modified as dependent or non-dependent, that is, the functional decline related to acute illnesses can appear weeks before an assessment, which would reduce the reliability in the test-retest. In addition to this, instruments based on the elderly or the informant's report can be influenced by illnesses that are common in older people.

In this sense, many studies can be mentioned. In fact, in a study, more pessimistic views about the elderly people's health were associated to the chance, nine times higher, of having moderate to serious dependency. Although this pessimistic view about their health could have been caused by their elevated functional dependency, the transversal nature of the study also leads to the assumption that elderly persons, with pessimistic views, could complain more about their health, overestimating their functional deficits during screening. It is also known that patients with depression complain more about chronic illnesses than non-depressed ones. In another Brazilian population inquiry, more than 1/3 of the elderly persons aged 85 or more met the criteria for the diagnosis of dementia. In fact, elderly persons with dementia tend to have a more optimistic view of their health, minimizing their deficits through inadequate judgment or memory.

Regarding the people who take care of demented elderly people, they undergo physical and psychic overload the greater the dependency and have the tendency to overestimate functional deficits. This fact suggests that the functional assessment, based on information provided by patients and informants, should be controlled by factors such as cognition and humor. Other factors that also influence screening validity are the elderly person's socioeconomic and educational levels. In fact, in an epidemiologic inquiry done in Rio de Janeiro, these were considered possible factors of confusion as they are associated with inadequacies of the multidimensional questionnaire based on the OARS.

Hearing deficits can permanently affect about one-fourth of elderly persons aged 70 and above. If, on the one hand, the hipoacusy is an important predictor of functional loss, on the other hand, it can harm the interview and, many times, require help from an informant, which can compromise the trustworthiness of the information.
The diagnosis changes verified in this study could be partially due to the factors mentioned above, but probably it also applies to the reliability of the tests. The low inter-observer accuracy must be considered in the planning of the studies that use these instruments in the general population.

The number of individuals from the control group could have led to less accurate specificity indexes. Taking into consideration the costs and time available for the accomplishment of this work and because we prioritize sensitivity as the most important index, upon comparing screening instruments, we accepted the number of controls given, which can be considered a limitation of the study.

However, with the need for instruments that can provide early identification of functional dependency and can contribute to the wide geriatric assessment, the BOMFAQ, with its good sensitivity, could be used as a screening test for the diagnosis of deficiencies. As HAQ was validated in a group of rheumatic people and not in a general population its use in others studies with similar sample characteristics could certificate the results found here.

REFERENCES