Author’s response to reviews

Title: Prevalence of Disability in a Composite [greater than or equal to]75-year-old Population in Spain: A Screening Survey based on the International Classification of Functioning

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Author's response to reviews: see over
Answer to referees

Reviewer 1: Marco Pahor

1. The major issue related to this study resides in the arguable representativeness of the study sample. In fact, differently from what stated by Authors (even in the article title), it is likely that excluded participants (due to missing data) may have somehow affected the reported estimates. This issue needs to be clearly and better discussed. Please, consider that the sampling frame is composed by 1,293 subjects; then, for various reasons (including decline to participation), it is reduced by more than a half.

It should be noted that losses shall not be counted from the original 1293 number of potential participants but from 216+219+546=981 (or less, given that part of those that were non-located may be dead). Losses resulted from dead and inability to locate individuals surveyed in earlier studies, circumstances unlikely to induce specific selection biases in a geographically-defined prevalent sample. Death excludes individuals from the pool of survivors. Non-located individuals (due to death or change of residence outside the geographic residence) shall also be
considered outside the sampling frame. The sampling procedure and losses of the study are described in a previously published article (doi: 10.1111/j.1600-0404.2010.01398.x) containing all methodological details of this project. Although the reader is referred to this publication, we agree with the reviewer that additional details should be added. The following explanation has been appended:

“Sampling procedure
We conducted a power analysis for cross-sectional designs (Aday 1996). The expected prevalence used during power analysis was that of individuals 70 years of age or more reported by de Pedro-Cuesta (2009) (i.e., 707/12,232). Precision was set to 2%. Power analysis indicated that a sample size of 523 or more participants was required.

We requested from the principal investigators of the original surveys a census-based random sample of individuals aged 75 years or more from the population originally surveyed in their respective prevalence studies. Sampling ended when an average of 60 participants per group was reached. We used nationwide age- and sex-specific mortality rates for the birth cohorts under study in order to estimate the number of participants to be sampled for each location (Spanish National Institute of Statistics, 2009). Mortality was proportional to the delay from the original survey and so were the number of participants to be sampled. Groups used their original census-based sampling procedure to avoid selection bias. In locations with very limited number of survivors a new geographically-defined sample was obtain from selected city neighborhoods. This approach ensured that the main attributes of all sub-samples in terms of environment, living arrangements and residential status were represented. Cohorts included individuals living in their homes and also those in residential care and were drawn from rural and urban areas. Losses resulted from dead and inability to locate individuals surveyed in earlier studies, circumstances unlikely to induce specific selection biases in a geographically-defined prevalent sample. Death excludes individuals from the pool of survivors. Non-located individuals (due to death or change of residence outside the geographic residence) shall also be considered outside the sampling frame. All local Human Subjects Review Board provided ethics approval.”

Newly added references


We have also changed the title as follows to avoid any implications of representativeness:

Prevalence of Disability in a Composite ≥75-year-old Population in Spain: A Screening Survey based on the International Classification of Functioning

2. A description of the participants' comorbidities might be important to understand 1) the representativeness of the sample, and 2) the significance of the reported estimates. This is also important to support some speculative statements made by Authors (e.g., page 14, second paragraph, lines 5-8).

Referees comments are well grounded, particularly the comment pertaining to comorbidity. In order to address this comment the following table emphasizing comorbidity has been added:
Table 3. General and specific prevalent health conditions and morbidity, %(n).

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th>Men</th>
<th>Both</th>
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</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circulatory</td>
<td>67.0 (211)</td>
<td>64.4 (121)</td>
<td>66.0 (332)</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>55.9 (876)</td>
<td>33.0 (62)</td>
<td>47.3 (238)</td>
</tr>
<tr>
<td>Ophthalmological</td>
<td>37.1 (117)</td>
<td>37.2 (70)</td>
<td>37.2 (187)</td>
</tr>
<tr>
<td>Mental</td>
<td>35.1 (110)</td>
<td>19.3 (36)</td>
<td>29.2 (146)</td>
</tr>
<tr>
<td>Endocrinological</td>
<td>29.8 (94)</td>
<td>27.1 (51)</td>
<td>28.8 (145)</td>
</tr>
<tr>
<td>Respiratory</td>
<td>11.1 (35)</td>
<td>37.8 (71)</td>
<td>21.1 (106)</td>
</tr>
<tr>
<td>Neurological</td>
<td>13.0 (41)</td>
<td>23.4 (44)</td>
<td>16.9 (85)</td>
</tr>
<tr>
<td>Immunological</td>
<td>2.5 (8)</td>
<td>3.2 (6)</td>
<td>2.8 (14)</td>
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<tr>
<td>Infectious</td>
<td>4.4 (14)</td>
<td>5.3 (10)</td>
<td>4.8 (24)</td>
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<tr>
<td>Neoplasm</td>
<td>14.0 (44)</td>
<td>14.4 (27)</td>
<td>14.1 (71)</td>
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<tr>
<td><strong>Specific</strong></td>
<td></td>
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<tr>
<td>Hypertension</td>
<td>56.2 (177)</td>
<td>48.4 (91)</td>
<td>53.3 (268)</td>
</tr>
<tr>
<td>Depression</td>
<td>20.0 (63)</td>
<td>5.9 (11)</td>
<td>14.7 (74)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>15.2 (48)</td>
<td>13.8 (26)</td>
<td>14.7 (74)</td>
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<tr>
<td>Smoking</td>
<td>1.3 (4)</td>
<td>26.6 (50)</td>
<td>10.7 (54)</td>
</tr>
<tr>
<td>Dementia</td>
<td>9.5 (30)</td>
<td>6.4 (12)</td>
<td>8.3 (42)</td>
</tr>
<tr>
<td><strong>Morbidity, M (SD)</strong></td>
<td>4.7 (3.1)</td>
<td>5.0 (3.2)</td>
<td>4.8 (3.1)</td>
</tr>
</tbody>
</table>

*Note.* Information retrieved through a physician-administered 51-disease checklist of prevalent diseases in elderly people. Health conditions and disease categories follow ICD-10. Sources: medical file, medical documents held by the examinees, and examinees’ self- and proxy reports.

Prompted by this comment by the referee we have also modified the paragraph below (from page 14):

[p. 15]

“Men and women differed in GAR and LAC domains. Activities in both areas require high cognitive and motor functioning suggesting that the higher prevalence of age-related musculoskeletal and mental disorders (particularly arthritis, osteoporosis and dementia; see Table 3) may underlie the difference in GAR and LAC performance between women and men.”

3. Page 15 ("...This approach may be superior to more classical means to determine functional status..."). Since this might represent a major strength of the manuscript, I would recommend better describe and discuss it in the appropriate section. In this context, it might be interesting comparing these findings from estimates derived from "traditional" instruments evaluating physical disability.
We find the comment appropriate. The term “traditional instrument” requires some elaboration. We address this comment by confronting two approaches to disability assessment: national disability surveys and ICF:

[p. 6-7]

“In summary, traditional approaches to disability assessment have focused narrowly on ADL (e.g., Katz index, Barthel index), sensory and cognitive disability [Spanish National Institute of Statistics, 1999, Graciani et al., 2004]. By contrast, the International Classification of Functioning, Disability and Health (ICF) incorporates a multifactorial approach to disability with two core components: limitations in activities and participation, and changes in body structure and functions. Under the ICF model diseases, environmental factors, and personal characteristics can all function as determinants of disability.”

[p. 7]

“Traditional approaches to disability assessment incorporate items relevant to disability, particularly for clinical use in nursing. However, they frequently amalgam items on function (e.g., digestive and urinary function, sphincter control) without any indication of impact on social functioning. By contrast, WHO-DAS II provides a systematic approach to various social and functional domains of disability, which are assessed separately over a single 5-point Likert scale. As an additional advantage, WHO-DAS II has been designed specifically for epidemiological use being available in various languages and formats (Üstün 2010).”

Newly added references


4. Why do Authors believe the ICF instrument is so rarely used? Since, Authors implicitly support a wider use of this test, they may want to better describe strengths and weaknesses of the instrument. For example, the very high missing data about sexuality might rise some concerns about its validity in older persons if this finding will come to be consistent with available literature (potentially suggesting a low acceptance from the tested subjects).
The instrument, in fact, has been rarely used. A PubMed search (WHO-DAS II [TIAB]) indicates only 36 studies using the instrument. The text below has been appended in answer to the referee’s comment.

[p. 17-18]

“The performance of WHO-DAS II as an instrument to inform activities and participation was satisfactory. However, specific aspects of the scale need to be developed further. For instance, the low acceptance of the sexuality item, suggest that this content (among others that are not applicable to all elderly population) needs to be reworded. In addition, WHO-DAS II does not assess the causes of disability therefore it is not highly useful to develop disability remediation strategies. In this respect, ICF coresets represent a recent expansion of ICF framework for the assessment of disease-specific aspects of disability. Coresets are composed of clusters of items that are distinctively affected under specific health conditions.”

5. Table 3. To better understand the meaning of the multitude of age- and gender-specific prevalence of disability, I would suggest reporting results from statistical comparisons across groups (e.g., across gender and age groups). In other words, this way of showing data does not allow to understand the clinical (or even statistical) meaning of the reported differences. This huge amount of data and estimates should be made easier to interpret by looking at the table (but even Figure 3, if needed; see below). Therefore, I would suggest including p values from comparisons across age and gender groups as well as p for trends,... Then, these results might be used to understand whether some phenotypes of disability are specific of particular population subgroups (thus, hypothesizing specifically tailored future interventions).

Table 3 and Figure 3 are/should be very similar. Are they both required? Which are the different information we can retrieve from each of them. Authors may want to avoid redundancies.

We agree with the reviewer comment. Table 3 with age- and sex- specific prevalences is now presented as supplementary online material. We have added the table below reporting systematic comparisons. We suggest to keep Figure 3 in the manuscript. It conveys effectively the raw prevalence of LAC and GAR, which is one of the crucial findings of the study.
<table>
<thead>
<tr>
<th></th>
<th>UAC</th>
<th>GAR</th>
<th>SCA</th>
<th>GAP</th>
<th>LAC</th>
<th>PSO</th>
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<td>1.19</td>
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<td>2.02</td>
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<td></td>
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<td>&gt;85</td>
<td>7.05**</td>
<td>1.89</td>
<td>4.54*</td>
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<td>5.33*</td>
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<td>[1.60, 15.95]</td>
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<td>80-84</td>
<td>1.95</td>
<td>1.24</td>
<td>4.22*</td>
<td>1.19</td>
<td>2.10*</td>
<td>1.75</td>
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<td>[1.09, 16.41]</td>
<td>[0.31, 4.55]</td>
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<td>[0.61, 5.02]</td>
<td>[0.92, 8.80]</td>
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<tr>
<td>&gt;85</td>
<td>3.88*</td>
<td>3.71**</td>
<td>8.98**</td>
<td>5.30*</td>
<td>6.33**</td>
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<tr>
<td>Female</td>
<td>1.40</td>
<td>1.99*</td>
<td>0.96</td>
<td>1.51</td>
<td>2.37**</td>
<td>1.18</td>
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<td>80-84</td>
<td>1.67</td>
<td>1.24</td>
<td>3.60*</td>
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<td>[0.72, 3.83]</td>
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<td>[1.36, 9.51]</td>
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<td>[0.77, 4.29]</td>
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<tr>
<td>&gt;85</td>
<td>4.60**</td>
<td>3.12**</td>
<td>6.87**</td>
<td>5.16</td>
<td>6.00**</td>
<td>4.16**</td>
<td>5.23</td>
</tr>
<tr>
<td></td>
<td>[2.23, 9.48]</td>
<td>[1.86, 5.22]</td>
<td>[2.75, 17.19]</td>
<td>[2.16, 12.36]</td>
<td>[3.44, 10.48]</td>
<td>[1.94, 8.91]</td>
<td>[2.39, 11.41]</td>
</tr>
</tbody>
</table>

Reference category in parenthesis. UAC: Understanding and communication; GAP: Getting along with people; LAC: Life activities; GAR: Getting around; PSO: Participation in society; SCA: Self-care.

* p < .01, ** p < .001
6. Page 10. Please, provide a reference or explain the sentence about the European standard population weights to justify their use.

   Direct prevalence adjustments are used to compensate the disparity in the age structure across genders between the population and the sample under study. For instance the 75-79 age group is larger in the reference population (50%) than in our sample (40.2%). The reference below has been added (see changes in Page 12).

   Newly added reference


7. Figure 3. Authors may want to use the same scale on the y axes of the graphs. To render the manuscript more consistent, Authors may want to use the same dependent variables of interest by also including the summary index evaluation in Figure 3 (if needed).

   Done as suggested
Reviewer 2: Maria Victoria Zununegui

1. Gender and regional differences may be of importance in identifying populations with high prevalence of disability in Spain. We recommend that the data be re-analyzed to increase understanding of the geographic and gender distribution of disability in this sample of older people.

   This possibility was sufficiently discussed in an earlier paper published from this dataset (doi: 10.1111/j.1600-0404.2010.01398.x). This point has been made explicit in the text (see page 9).

2. Abstract: Change sentence in results section of the abstract: "Sex variations were minimal", since sex prevalence rates are very different according to domain and age groups. Particularly, severe mobility disability (GAR) is more frequent in women than in men and the prevalence ratio is more than double among the 85 years and over. Same is true for severe Life activities disability. And these two domains have the highest prevalence for every age group.

   The sentence has been deleted.

3. Introduction: The authors state:" The ICF system may provide a more comprehensive framework to disability..." but this is not clear from the current introduction.

   This point has been already addressed in the answer to comments #3 and #4 of Reviewer 1.

4. The use of ICF to measure disability in the older population has been previously criticized. The advantages of using the ICF classification instead of the more commonly used Activities of Daily Living and Instrumental Activities of Daily Living is controversial. Advantages of ICF should be more clearly stated. For example, are there ICF advantages related to planning for services to cover unmet needs of disabled people? Are there any advantages of ICF related to research on physical and mental function in old age?

   The following text additions have been made:

   [p. 7]

   “The ICF provides the basis to develop disease-specific disability profiles [8]. Moreover, the ICF facilitates the identification of targets in rehabilitation, assessment of intervention outcomes, and social and health service planning [9]. For instance, ICF-based models of assessment, as the WHO Disability Assessment Schedule for epidemiological use (WHO DAS-II) [10], pinpoint specific spheres of the individuals personal and social functioning, which may be linked to specific needs of social support. Along these lines the ICF checklist for
clinical use [11] provides a multi-faceted classification of the components of disability, the impact of environmental aids and the composition of the package of services that may best suit the needs of a particular.”

Newly added references


5. Methods: Please change wording in text and graphics from "Negative WHO-DAS II” to "score of zero in WHO DAS II”.

Done as suggested.

6. Was non-computable WHODAS 36 associated significantly with cognitive impairment?

Cognitive function of participants with non-computable WHO-DAS II was probably slightly inferior than for those with computable scores. Only 25 among the 41 participants with non-computable WHO-DAS II had computable MEC scores, and among those, cognitive function was significantly lower (23.58±10.01 vs. 27.66±6.18; Wilcoxon W, p = .033). These differences are of moderate-low magnitude and within standard criteria for computable scores (Van der Liden et al. 2005). This point has been made explicit in the text (see page 16).

Newly added reference


7. According to table 1, the study sample has little education. It is well known that the MMSE has a strong education bias with high proportions of false positives among those with less than high school education. Is the MMSE an appropriate screening tool for this population?

We refer the reviewer to a discussion in the original paper (doi: 10.1111/j.1600-0404.2010.01398.x) about this issue. See quotation below.
“[H]igher educational level of false-negative participants (77.8% vs 32.3% with complete primary education or above) may have also contributed: they scored an average of only 3 points above the cut-off. It has been suggested that further validation studies are needed to allow education-sensitive cut-off adjustments (32), which are currently not customary in the Spanish version of the MMSE.” (p. 7).

8. Results. Two thirds of the sample is living in populations with less than 10000 inhabitants. Is this representative of the population of older people in Spain?

The actual proportion in the population is 60%, therefore very close. See figures below (source INE population projections based on 2001 census, http://www.ine.es/censo_accesible/es/seleccion_colectivo.jsp?fType=1). This point has been mentioned in the text as a potential source of bias.

| Age: 75+, Municipality: ≤10000 inhab. (no. individuals) | 1,688,313 |
| Age: 75+, Municipality: >10000 inhab. (no. individuals) | 1,189,458 |
| Total | 2,877,771 |

Text added:

[p. 13]

“Two-thirds of the sample was living in rural areas (municipality size ≤ 10000 inhabitants). The actual proportion in the populations is slightly inferior (∼60%, http://www.ine.es/censo_accesible/es/seleccion_colectivo.jsp?fType=1), which may have bias slightly our results in terms of disability.”

9. Seventy per cent of those in the 85 years old group are women. Is this representative of the very old population in Spain?

The actual proportion according to the National Institute of Statistics is 69.84% (492628/705365*100) (Source: Spanish National Institute of Statistics).

10. In that case, a sex-specific analysis of the data may be important for planning of services. In addition, age-adjusted and raw prevalence rates are not very different (See figures). However, sex differences seem to be quite important. We would suggest the authors to replace current figures with figures showing sex-specific age adjusted prevalence of disability in each domain.

Done as suggested

11. Samples are coming from areas of Spain with large differences in the level of education of the elderly population (For instance, Galicia and Catalonia). Could sex-specific age adjusted prevalence of disability be given by region and could an
ecologic association be drawn between education and disability prevalence? Geographic variation may help identify populations in regions with high needs of services.

Individual samples are small to conduct the analyses suggested. Please refer to the original paper for more details.

12. Discussion: In the first sentence of the discussion (This study is the first population-based survey reporting disability prevalence assessed according to the ICF framework), do the authors refer to studies in Spain, studies on the older population or both?

There have been similar studies conducted recently (Adib-Hajbaghery 2007; Donmez, 2005). The sentence has been reworded as follows:

[p. 15]

“This study is among the few population-based surveys reporting disability prevalence assessed according to the ICF framework (cf. Adib-Hajbaghery 2007; Donmez, 2005).”

Newly added references


13. Please state: 390,000 individuals older than 75.

Done as suggested (p. 16).

14. Some sensitivity analyses could be done to evaluate the underestimation of disability due to lack of complete data among those with dementia. In fact this does not seem to be a large source of bias. There are 7 out of 48 dementia cases (15% of dementia cases) with incomplete data for WHO DAS. Is the percentage of incomplete data among those without dementia 36/394=9%?

The information requested by the referee can be retrieved from Figure 2: 36 individuals without dementia had non-computable data over a total of 497 individuals without dementia in the study sample (36/497=7.2%). The figure increases to 7.2% if we consider individuals with positive WHO-DAS II without dementia and non-computable WHO-DAS II 36 items. As indicated before these details can be retrieved from Figure 2. Please advice if any additional information needs to be added to the text.
14. A comment of the rural composition of the study sample and their possible higher prevalence of dementia compared with urban populations, could be added to the discussion.

   The issue indicated by the referee is rather complex, we have made a brief reference to it as follows:

   [p. 16]
   “Given the mixed rural and urban sample in the present study, we should comment on the impact of habitat on dementia. In a recent re-analysis of studies on the prevalence of dementia in Spain, suburban populations showed higher prevalence of Alzheimer’s disease while vascular dementia was higher among suburban populations. The pattern was not replicated among urban-mixed populations and there is a paucity of evidence for rural populations (de Pedro Cuesta, 2009).”

15. Are there any further conclusions related to potential policy implications?

   We have added the following:

   [p. 18-19]
   “Our findings are descriptive and no direct policy implications result from our study. Nonetheless, our results are consistent with setting the prevention and remediation of severe/extreme disability in mobility and life activities as a priority for service planning. Strategic actions would require a more thorough examination of disability causes, which are currently the focus of our team.”

16. Should findings be confirmed in populations living in large cities since these results are based on a mostly rural sample?

   Our sample is not rural. It is composed of rural-mixed (Arosa, Cantalejo), suburban (Getafe, Leganés) and urban (Madrid, Zaragoza) subsamples (please refer to Virues-Ortega et al., 2010 for more details).
Reviewer 3: Somnath Chatterji

1. There are several clarifications that are needed before the paper can be accepted. In the background section, the authors cite the National Survey on Disability, Impairments and Health of INE and state that 95% of individuals with disability were over age 65! If this is indeed true, there must be reasons either in the methodology or definition that has contributed to these proportions. A comment about this is warranted.

   The actual figure is 59% (2,072,652/3,528,220=58.7%; refer to the link below from the Spanish National Institute of Statistics). We apologize for this typo.


2. Also, the authors state that they accounted for 33% of the population within that age range. This latter statement is unclear: does it mean that 33% of those over age 65 were disabled as identified in this survey?

   Yes. We have reworded the sentence to clarify this point (see p. 6).

3. In the methods section, the authors do not state clearly if they used the standard WHO approach to scoring the WHODAS full version or did they just sum across all items. For domain 5 of the WHODAS, the scoring section allows separate scoring for the household and work related items. Was this implemented?

   The preliminary scoring rules developed by the WHO were used as provided by the WHO Spanish Official Group. Work domain was not incorporated, as most individuals had no formal work activities. These points have been made explicit in the text (see page 12).

4. The authors say they used the European standard population. It is unclear why they needed to age standardise the results and if they can justify that why they did not use the Spanish population estimates from INE rather than a European standard population.

   It is important to use European standards to strengthen the comparability of our results with those from other international studies. About the need for standardization the referee is referred to comment #6 (Reviewer 1).

5. In the discussion section, the authors state that the prevalence of disability was 64% as compared to 46% in the national survey. But, as note earlier, in the introduction the reader gets the impression that the latter figure was 33%. This needs clarification.

   The prevalence of disability among those aged >75 in the National Disability Survey (1999) is 46% and 64% in the present study. The prevalence of disability according to the National Disability Survey (19999) for those aged >65 is 33%.
Figures are legitimately described in the text (refer to comment #2 and changes in the current version of the manuscript on page 6).

6. In Table 2, the labels for n and % have been reversed.

   Error has been corrected.

7. The authors need to comment on the fact that 106 of 546 respondents 75 years and older reported NO difficulty (not even mild) on ANY of the 12 WHODAS12 items. This would seem rather surprising based on other experiences of the use of the same instrument.

   We are uncertain about what other studies the reviewer refers to. In a recent use of WHO-DAS II in Spanish population of slightly younger participants (>70 year-old) a 203/410 negative/positive ration was obtain (de Pedro 2010), which is consistent with the performance of the scale reported in the present study.

   de Pedro et al. ICF-Based disability survey in a rural population of adults and older adults living in Cinco Villas, Northeastern Spain: Design, methods and population characteristics. Neuroepidemiology. DOI: 10.1159/000311040.

8. The authors also need to comment if the baseline characteristics from the original epidemiological study of the non-respondents were in any way different from those who were traced and interviewed for this study.

   This point has been address in the answer to comment #1, Reviewer 1.

9. Needs some language corrections before being published.

   Language and style has been revised throughout.