Author's response to reviews

Title: The relationship between literacy and multimorbidity in a primary care setting

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Version: 4 Date: 14 February 2012

Author's response to reviews: see over
February 14th, 2012

Editorial Office Biomed Central

Dear Dr Lorraine Wallace,

On behalf of my colleagues and myself, I would like to thank you and the reviewers for reviewing our manuscript “The relationship between literacy and multimorbidity in a primary care setting” (MS: 1009359848643946), submitted for publication to BMC Family Practice. Please, note that we have changed the term “health literacy” to “literacy” in the title of the revised manuscript.

Below, you will find a detailed response addressing each peer reviewer’s comments.

Reviewer: Sandra Smith

COMMENT:
1. [Major compulsory revision] The paper would be significantly strengthened by a clear differentiation between basic literacy and health literacy. The terms are used interchangeably, inferring in contradiction to state the definition of health literacy that health literacy is simply ability to read.

RESPONSE:
We acknowledge that we used interchangeably the terms “literacy” and “health literacy” in our paper. We are dealing with reading related skills in our study. To answer this comment, we included a clear differentiation between basic literacy and health literacy in the introduction and changed the term “health literacy” for “literacy” throughout our article.

COMMENT:
2. [Major compulsory revision] This problem reflects the use of the NVS as a measure of health literacy. The authors correctly state that the NVS is validated against other measures of literacy, not health literacy (TOFHLA, which is validated against the REALM). NVS measures only reading skills and says nothing about ability to access, evaluate, communicate or apply information to promote, maintain or improve health. Therefore the title, discussion and conclusion would be more accurate if they referred to literacy rather than health literacy, in accordance with cited authors.

RESPONSE:
As mentioned above, we now refer to literacy rather than to health literacy throughout the paper.

COMMENT:
The description of the NVS should specify internal reliability and discuss validity of the instrument as a measure of literacy versus health literacy.
RESPONSE:
In Methods we mention the internal reliability of the NVS (Cronbach alpha > 0.76) and address the validity of the instrument as a measure of literacy.

COMMENT:
3. The authors are to be applauded for considering confounders. Here again, the issue of literacy versus health literacy rises. The confounders addressed relate to basic literacy. Multiple additional systemic, social, and environmental factors interact to determine health literacy as defined, and health literacy involves an array of interactive and reflective skills in addition to reading (Nutbeam 2008). (This will not be problematic if the authors report on literacy rather than health literacy). One of these factors in health literacy is experience. Health literacy as defined develops over time with need, opportunity and experience; so that patients with multiple chronic conditions can be expected to have more vocabulary, disease knowledge and self-care capacity than a newly diagnosed patient. The NVS could not detect or reflect this experience, and so may underestimate health literacy in this sample of experienced patients. This should be noted under Limitations. Also, if patients have low reading ability, the reliability of their responses to the self-administered questionnaire must be suspect. [Major compulsory revision]
RESPONSE:
We have corrected these problems by reporting on literacy rather than on health literacy.

COMMENT:
4. [Minor revision] The literature suggests that an individual who has completed 12 years education is very unlikely to have low basic literacy. The reported education levels would be more informative if stratified as <12 years versus > than 12 years.
RESPONSE:
We changed Table 1 to report education levels as suggested.

COMMENT:
5. [Minor revision] The writing is clear, with one exception. In the introduction, the authors refer to "difficult self-care" as a health outcome. Both the term and its categorisation as an outcome need clarification.
RESPONSE:
We agree it was not clear. We have thus removed this sentence.

COMMENT:
The authors have demonstrated that multimorbidity is not related to reading ability. This is an important finding that suggests other categories of literacy skills affect patients' ability to use information for health. The finding confirms the need for new measures that reflect the reality of health literacy in people's lives.
RESPONSE:
We thank the reviewer for this interesting remark. We included the remark in the discussion and the conclusion of the paper.
Reviewer: Suad Ghaddar

Major Compulsory Revisions
COMMENT:
1. The association between health literacy and poor health has been well established in the literature. The absence of a relationship between health literacy and multimorbidity in this manuscript highlights the need for more work in the area. However, the small sample size diminishes the ability to generalize results or draw definitive conclusions. In addition, a more thorough discussion has to elaborate on the implications of the absence of such a relationship; for example, would there be a different approach to handling multi-morbid patients from a health literacy perspective? Both the small sample size and the absence of important implications for study findings weaken the article’s contribution to the literature.
RESPONSE:
We agree that our sample size was small but we had enough power to conduct multivariate general linear modeling analysis. With the same sample, we found positive relationship between multimorbidity and family income and age as described in the literature. Moreover, we were able to recruit a group of patients with a good distribution of multimorbidity and literacy. We elaborated on the implications of such relationship in the discussion. We explain that finding an association would have unveiled an aspect that could be included in the strategies aiming to prevent the occurrence of multimorbidity. We also include at the end of the same paragraph that our findings suggest that other categories of literacy skills may affect patients’ ability to use information for health. Maybe new measures that reflect the reality of health literacy in people’s lives could be more appropriate to evaluate this relationship.

Minor Essential Revisions
COMMENT:
2. Table 1 needs a title
RESPONSE:
We submitted the article with a title in Table 1. It seems that, for some reason, during the process of making the PDF document they were separated. We will pay attention to this error and try to prevent this from happening again.

COMMENT:
3. Table 1: Switching between the actual number of participants (n) and the frequency (%) when reporting descriptive statistics for discrete variables makes it hard for the reader to get a picture of the sample. While frequencies are easier to follow, being consistent in reporting is the most important part.
RESPONSE:
We corrected Table 1. All data are now reported as frequencies (%), except those expressed by means and standard deviations.
COMMENT:
4. Data analysis section: It would be good to include the dichotomous DBMA measure that is included in Table 1 but not referred to in the text. It is also better to identify the multivariate model used.
RESPONSE:
We identified the multivariate model (multivariate general linear modeling) as suggested. Regarding the DBMA, we are not sure if we interpreted the comment correctly. The DBMA was not treated as a dichotomous variable. DBMA11 and DBMA6 are two distinct continuous variables explained in Methods under the heading “Instruments”. We explain under Data analysis that both operational definitions of multimorbidity were used successively as dependent variable in the multivariate analysis.

COMMENT:
5. In the data collection section, it is essential to describe the primary care setting from which the sample was recruited, especially that the authors later on mention that they "expect the same results from similar primary care settings."
RESPONSE:
We added to “Study design and setting” a better description of the region and the primary care setting from which the sample was recruited.

Discretionary Revisions
COMMENT:
6. It would be good to add more detail to the data collection section. For example, the population served by the family medicine clinic selected for recruitment, how many patients were approached, what percent agreed to participate, basic characteristics of those who refused.
RESPONSE:
We now provide more detail to the data collection section. Those who refused to participate did it when the research assistant approached them proposing to determine their eligibility for the study. They did not even complete the short questionnaire to determine their eligibility and no data were collected from them.

COMMENT:
7. One of the authors' discussion points is that an "association between health literacy and multimorbidity could exist only when two or more specific diseases individually related to health literacy coexist in an individual, for example diabetes mellitus and heart failure." It would be interesting to investigate the relationship between health literacy and multimorbidity for only these two diseases in the study sample.
RESPONSE:
We agree, but unfortunately we did not have enough patients for such analysis. We added this point to our discussion.
Reviewer: Radhika Devraj

Major Compulsory Revisions

Introduction
COMMENT:
1) There is not much description of why health literacy matters except for a listing of literature about health literacy and patient outcomes. While I understand the significance of health literacy being in the field, it may not be clear to others. A lot more details about the significance of health literacy need to be included.
RESPONSE:
We expanded the introduction and added the significance of literacy.

COMMENT:
2) Again, while the definition of multimorbidity was provided and a listing of studies linking multimorbidity to poor outcomes, there needs to be additional description about multimorbidity as an issue. Just two sentences about multimorbidity do not seem to suffice as an introduction.
RESPONSE:
We included in the introduction additional description about multimorbidity as an issue.

COMMENT:
3) The authors indicate in the third paragraph that “the possible association between health literacy and multimorbidity has not yet been explored”. There is no reference to literature that has looked at various aspects of multimorbidity, or to other topics related to multimorbidity prior to making this statement. See point 2 of Discussion for additional information.
RESPONSE:
This part of the introduction was expanded according to the reviewer’s suggestions.

Methods
COMMENT:
In the section:
1) Participants and sampling—
One criterion is for patients to be able to read. If patients are able to read, then automatically, they have some level of health literacy (although it is fully understood that reading is just one aspect of health literacy) better than those who cannot read. This may potentially create a biased sample. It would have been best if all data collection were performed by interview rather than requiring them to read as a criteria.
RESPONSE:
Although we did not find the situation of a patient unable to read, indeed it was not an inclusion criterion, and we removed this inclusion criterion from the text. We did find the situation of patients with the ability to read but who did not have their glasses with them. In such cases, the research assistant helped them reading the questionnaires.
COMMENT:
2) More details describing the family medicine clinic site where data was collected is needed.
RESPONSE:
As mentioned in a response to another reviewer, we included more detail describing the family medicine clinic.

COMMENT:
3) Why was the original DBMA instrument with 21 diseases not used? What is the rationale for using DBMA 6?

RESPONSE:
Answers to both question are now included in Methods. Only 11 diseases with a high prevalence in our setting were kept in order to reduce the time needed to complete the questionnaire. DBMA 6 was created taking into account 6 conditions which were considered to be associated with lifestyle habits or that had been reported to be independently associated with inadequate literacy. With this variable we hoped to have a multimorbidity measure that, at least theoretically, could be associated with literacy.

COMMENT:
4) Data collection:
More details about data collection need to be provided. How long did the data collection process take? Was any remuneration provided to participants? How and when was informed consent obtained? When patients did not meet eligibility criteria how was it handled?
RESPONSE:
Answers to all these questions were added to the text.

COMMENT:
Data Analysis
1) What was the rationale for using two operational definitions of multimorbidity?
RESPONSE:
We now explain in the text that the second operational definition of multimorbidity (DBMA 6) was computed to have another variable that, at least theoretically, could be associated with literacy.

COMMENT:
2) Why was marginal and adequate literacy combined together? According to NVS criteria, a score less than 4 suggests low to marginal literacy. A score equal to or greater than 4 implies adequate literacy. The authors’ criteria for low/adequate/marginal health literacy are however different from this. They indicate that a score greater than 4 was marginal to adequate literacy. This is not what the NVS publication implies. So it is unclear what marginal literacy is and what adequate literacy is.
RESPONSE:
We corrected this aspect. We now explain that a score equal to or greater than 4 implies adequate literacy.

COMMENT:
3) What specific multivariate analyses were performed? This needs to be specified as the reader is left guessing.
RESPONSE:
As mentioned above when responding to another reviewer, we now identify in the text the multivariate model used (multivariate general linear modeling).

COMMENT:
4) Why was impact of duration and severity of disease not considered in the assessing multimorbidity? These would have a profound impact on multimorbidity.
RESPONSE:
As it happens with health literacy, multimorbidity is an ill-defined construct. Current operational definitions of multimorbidity do not consider duration of disease an issue. On the other hand, assessing severity is an important aspect. The DBMA takes into account the burden that the diseases represent for the patient. As explained in the text, “…patients identified in the list of 11 conditions, those that they had, and rated the interference with daily activities of each condition on a five-point scale from 1 (“not at all”) to 5 (“a lot”). The total multimorbidity score is the sum of conditions weighed by the level of interference assigned to each”. In other words, the DBMA evaluates disease severity from the patient’s point of view.

COMMENT:
Results
The results section needs to be further elaborated. The results section needs to elaborate more about DBMA scores, what was the distribution, what was the median score etc. Additional analyses and details must be considered to enhance this section. Currently, it reports on three specific analyses in three specific paragraphs. This does not seem sufficient enough.
RESPONSE:
We further elaborated the results section. We now include a figure showing the distribution of the DBMA scores. The median score of each operational definition was added to the text.

COMMENT:
Discussion
1) Once again, the discussion does not contain enough evaluation of the results. The first paragraph of the Discussion section states the most significant result. The reader is then left hanging with respect to what this result means. In other words, there is no discussion/elaboration of that key result. The so what question about the key result is not answered.
RESPONSE:
We expanded the discussion and we hope we answered the “So what?” question: Establishing an association between literacy and multimorbidity would have unveiled an aspect that could be included in the strategies aiming to avoid the occurrence of multimorbidity. Also, we explain that other categories of literacy skills affect patients' ability to use information for health.

COMMENT:
2) The second paragraph starting with “To our knowledge” talks about the literature. This should be moved to the Introduction to make a case for the significance of conducting the current study.

RESPONSE:
We moved part of the paragraph to the introduction to support the significance of conducting the study. The complete paragraph was too long for the introduction and part of it was still pertinent for the discussion

As requested, we have provided written responses following each point made by the reviewers. We hope that you now find our revised manuscript suitable for publication in your journal and look forward to hearing from you.

Sincerely,

Catherine Hudon MD PhD CMFC