Author's response to reviews

**Title:** Depression after low-energy fracture in older women predicts future falls: A prospective observational study

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**Author's response to reviews:** see over
Reviewers' Comments

Referee 1, Joan Dodson

Minor essential revisions
1. The Results section is not clear, specifically paragraphs three and four in the Results section. In fact, in order to understand the results I had to go to the back of the paper and actually look at the tables. As the relationship between depression and falls is the whole point of the paper, the Results section need to be clearer.
We have rewritten parts of the Results section and added information to it to be clearer (page 7 line 166, 168, 174, 175, 179-183; page 8 187-192, 203, 208). Furthermore we added headings to the Results section to make the content more understandable.

Discretionary revisions
1. The background paragraph in the Abstract should be rewritten. I had to reread it twice, slowly, in order to understand the flow of the sentences.
We have rewritten the background paragraph in the Abstract (page 2 line 30-33).

2. Please define 'low-energy' fracture in the beginning of the paper when it is first used (second paragraph, background section).
We added the definition of 'low-energy' fracture at the proposed place in the manuscript (page 3 line 60).

3. In the depressive symptoms section of the methods: a note that higher scores mean greater depression would be helpful.
We added a sentence at the end of the depressive symptoms section of the methods in which we indicate that higher scores represents the presence of more depressive symptoms (page 6 line 149).

4. In the statistical analyses section: should be 't' test, not 'T' test.
We adjusted the capital T of 'T-test' into a lower case t (t-test) (page 6 line 154).

5. In the Conclusions section: 'should anticipate on the presence of depression' perhaps rewrite as 'should anticipate the presence of depression'.
We rewrote the proposed sentence (page 12 line 283).

6. A correlation table would be very helpful.
We are confused about what is meant by the addition of a correlation table. To our knowledge a correlation table is administered with continuous variables. In our study, only age and bone mineral density of the femoral neck of the hip and the lumbar spine are continuous variables. Furthermore depressive symptoms is measured as a continuous variable and therefore can be used as well in a correlation table.

As most of our variables are dichotomous or categorical we chose to use $X^2$ tests and logistic regression analysis with odds ratios as these methods are intended to give more information about the relationship between dichotomous and categorical variables and with logistic regression analysis the inclusion of continuous variables is also possible.

To give more information about the relationship between the above mentioned continuous variables we added a correlation table (page 7 line 155, 156; page 8 line 195-201; page 8 Table 3). We are happy to adjust this aspect of the paper if this was not what the reviewer meant.
7. I would be interested in reading a short paragraph on WHY the authors think depression may be related to falls. Although I realize that is not the intent of the paper, depression and falls is not an intuitive connection, and I wonder why depressed women may be falling more...

We added a paragraph in the Discussion section of the paper on why we think depression may be related to falls (page 11 line 255-261).

A general comment: I think depression in the elderly is an important topic that deserves increased research attention, and this paper is a good addition to the field.

Referee 2, Pariya Fazeli

Discretionary revisions
1. Throughout the paper you refer to "chi square" as "X2" when the X should be italicized (X2).
We adjusted "X2" into "X2" (page 2 line 41; page 7 line 172, 183; page 8 line 188).

2. It would be helpful to have a definition of a "low-energy fracture" in the second paragraph of the background section where you first introduce this term. You do define this in your methods section, so the reader eventually gets this info, but including it sooner in the paper would make things much clearer.
We added the definition of 'low-energy' fracture at the proposed place in the manuscript (page 3 line 60).

3. Throughout the paper when you reference tables and figures you do not capitalize the first letter of the word in the parentheses. For example (table 1), instead of (Table 1). This is very minor and you may choose to leave it as is. As per APA however, this first letter would need to be capitalized.
We adjusted the lower case first letter of the word in the parentheses into a capital letter when we refer to a table of a figure (page 4 line 88, 94, 107; page 7 line 168, 183; page 8 line 188, 208).

4. Perhaps add a sentence at the end of the depressive symptoms paragraph of the measurements section stating that higher scores on the EDS indicate more depression. While this is implied it may be useful to make this explicit statement.
We added a sentence at the end of the depressive symptoms section of the methods in which we indicate that higher scores represents the presence of more depressive symptoms (page 6 line 149).

5. Throughout the paper you refer to a T-test with a capital T when it should be a lower case t (t-test).
We adjusted the capital T of 'T-test' into a lower case t (t-test) (page 6 line 154).

6. In the second sentence of the statistical analysis section you say "with falls as the dependent variable". Perhaps you could be more specific and convergent with logistic regression terminology and say "with presence or absence of falls as the dependent variable".
We were pleased to take over the proposed terminology (page 7 line 157, 158).

7. The results section in general is a bit unclear. Referring to the tables helped clear up some things but you may consider reworking your results section a bit.
We have rewritten parts of the Results section and added information to it to be clearer (page 7 line 166, 168, 169, 174, 175, 179-183; page 8 187-192, 203, 208). Furthermore we added headings to the Results section to make the content more understandable.

8. At the beginning of the first sentence of the third paragraph of the discussion section change "in contrast" to "in addition".
We changed "in contrast" to "in addition" (page 10 line 240).

9. It would be nice to see some correlation tables. This would provide the reader with more information about the relationships between variables, specifically the strength and direction.
We are confused about what is meant by the addition of a correlation table. To our knowledge a correlation table is administered with continuous variables. In our study, only age and bone mineral density of the femoral neck of the hip and the lumbar spine are continuous variables. Furthermore depressive symptoms is measured as a continuous variable and therefore can be used as well in a correlation table.

As most of our variables are dichotomous or categorical we chose to use $\chi^2$ tests and logistic regression analysis with odds ratios as these methods are intended to give more information about the relationship between dichotomous and categorical variables and with logistic regression analysis the inclusion of continuous variables is also possible.

To give more information about the relationship between the above mentioned continuous variables we added a correlation table (page 7 line 155, 156; page 8 line 195-201; page 8 Table 3). We are happy to adjust this aspect of the paper if this was not what the reviewer meant.

Minor essential revisions
1. In the results section on the abstract the word baseline has a dash in it (base-line) whereas in the rest of the paper you use "baseline".
We adjusted the word (page 2 line 40).

2. In the measurement section in the risk factors for falling paragraph there should be a comma after the word "consumption".
We added a comma after the word consumption (page 5 line 129).

3. In the third paragraph of the results section add something to the first sentence indicating that it refers to the entire sample (e.g., "Of the entire sample…32 women (18%) suffered from depression at baseline...").
We adjusted the first sentence in the third paragraph of the results section (page 7 line 179, 180).

4. In the first sentence of the discussion section you need to add the word "older" before post-menopausal women.
We added the word "older" before post-menopausal women (page 10 line 225).

5. In the second paragraph of the discussion section you need to add the word "of" between "general population" and "Dutch women".
We added the word "of" between "general population" and "Dutch women" (page 10 line 230).

General comment: Overall this was a very sound paper, as you can tell by the very minor and discretionary revisions.
Referee 3, Jaspreet Kaur

Major points

1. Suspects from only two hospitals limits the study's credibility unless the author is trying to search for a local problem, which seems to not be the case. We added this aspect as a limitation of the study (page 11 line 263).

2. Additionally to EDS, another more to the population geared scale should be included, such as the Geriatric Depression Scale to better assess for risk factors. We wish to disagree on this point. The EDS has proven a valid scale for use in postmenopausal women and therefore justifies the use of this scale in the described population (Cox et al. Validation of the Edinburgh postnatal depression scale (EPDS) in non-postnatal women. J Affect Disord 1996, 39:185-189; Becht MC et al. Measuring depression in women around menopausal age: Towards a validation of the Edinburgh depression scale. J Affect Disord 2001, 63:209-213).

3. Although the subjects were initially chosen due to their injury, when the characteristics are being assessed at baseline, falls ought to be questioned and categorized more in detail, such as type of fall, differentiation between number of falls within 6, 12, and 18 months, need of medical treatment due to the respective fall. We agree that a more detailed description of falls would help to give more insight in the nature of falls and therefore we described this as a limitation of the study (page 11 line 273-275).

4. There is a substantial lack of analysis and explanation of falls related to depression. The article focused too much on the medical aspects of fractures leading to falls in elderly. More attention should be invested into depression versus co-morbidities, not fracture/falls versus co morbidity, and why depression ultimately leads to falls. We added a paragraph in the Discussion section of the paper on why we think depression may be related to falls (page 11 line 255-261).

Minor

1. In results, an interesting and verifying correlation to be made between falls and married or single individuals or individuals with family support is also of great significance. This data can be used for the logistic regression analyses. We added the variable marital status into the logistic regression analyses (page 9 table 4a and table 4b)

2. Besides tables at the end, better visual charts or graphs should be included right after the methods or results section for easier explanatory illustrations preventing repetitive phrasing that conveys a dry and unattractive We have added the tables in the text for more clarity.

Associate Editor's Comment

1. It would be helpful to define "low-energy fracture" up front in the article. As such, it is not clear. We added the definition of 'low-energy' fracture at the proposed place in the manuscript (page 3 line 60).

2. Two reviewers mentioned the incorporate of correlation tables would be helpful in showing the basic relationships between the variables. We are confused about what is meant by the addition of a correlation table. To our knowledge a correlation table is administered with continuous variables. In our study, only
age and bone mineral density of the femoral neck of the hip and the lumbar spine are continuous variables. Furthermore depressive symptoms is measured as a continuous variable and therefore can be used as well in a correlation table.

As most of our variables are dichotomous or categorical we chose to use $X^2$ tests and logistic regression analysis with odds ratios as these methods are intended to give more information about the relationship between dichotomous and categorical variables and with logistic regression analysis the inclusion of continuous variables is also possible.

To give more information about the relationship between the above mentioned continuous variables we added a correlation table (page 7 line 155, 156; page 8 line 195-201; page 8 Table 3). We are happy to adjust this aspect of the paper if this was not what the reviewers meant.

3. The first two reviewers commented that the results section should be rewritten. After reading it myself, I don't think that is necessary; however, it would be helpful to add more detail about the tables in the results section. Just expand to talk about the information in the tables more instead of presenting very brief results. A better narrative of the tables would help with communication.

We have rewritten parts of the Results section and added information to it to be clearer (page 7 line 166, 168, 169, 174, 175, 179-183; page 8 187-192, 203, 208). Furthermore, we incorporated the tables in the text for more convenience in reading the results. We also added headings to the Results section to make the content more understandable.

4. I agree with the first two reviews. I too would "be interested in reading a short paragraph on WHY the authors think depression may be related to falls." The connection is not clear and some sort of linkage is needed.

We added a paragraph in the Discussion section of the paper on why we think depression may be related to falls (page 11 line 255-261).

5. Other than that, I think the first two reviewer provided some very detailed information that could be included on formatting and so forth that the authors should consider in resubmitting and revising this manuscript.