Reviewer's report

Title: Patterns of ambulatory medical care utilization in elderly patients with special reference to chronic diseases and multimorbidity - Results from a claims data based observational study in Germany

Version: 2 Date: 29 April 2011

Reviewer: Laura Deckx

Reviewer's report:

I. Major Compulsory Revisions

1. Discussion

The results are interesting, but the discussion needs further improvement. Not all aims and (important) results were addressed in the discussion, some topics were discussed in several paragraphs and not combined in one paragraph (e.g. frequency of contacts currently discussed in paragraph 2 & 8) and some paragraphs were unclear (paragraph 11).

I suggest the following scheme:

Paragraph one: very brief summary of the aims
- What was the frequency of contacts and number of physicians contacted
- What was the influence of the other factors (age, sex, number of multimorbidity pattern and nurse dependency) on utilization
- What was the association between utilization of primary care physicians and specialists

Paragraph two:
- Elaborate on the frequency of contacts and number of physicians contacted
- In comparison with other countries

Paragraph three:
the influence of other factors on utilization
- Age
- Sex
- Number of chronic diseases
- Multimorbidity pattern
- Nurse dependency

Paragraph four:
association between utilization of primary care physicians and specialists in
comparison with other countries

Paragraph five: weaknesses and strengths of this study

Paragraph six: conclusions

II. Minor Essential Revisions

1. General remarks

1.1. Not all aims correspond clearly with the methods, reported results and the discussion:

1.1.1. In the aims it is mentioned that also the utilization of primary care physicians in relation to specialists is investigated.
- In the methods it is not explained how this is investigated
- In the results you discover it is investigated via referral rates, although the subtitle “size, mode and target of referral” is not helpful. I suggest changing this subtitle.
- In the discussion it is concluded in paragraph 7 that the results indicate a centering of utilization. However, the association between utilization of primary care physicians and specialist is only discussed in paragraph 9.

1.1.2. Another aim that is mentioned in the abstract (and not in the introduction) is that the ambulatory medical care utilization will be investigated in relation to patterns of multimorbidity.
- In the methods it is not explained how these patterns of multimorbidity are investigated (e.g. it is not explained how the triadic combinations were calculated)
- In the discussion multimorbidity patterns are not discussed. However, in the results section (even in the results presented in the abstract) numbers for contact frequencies are also shown for triadic combinations.
- Strikingly, the number of contacts per year was lower for triadic combinations than for certain separate chronic diseases, also this was not commented on in the discussion (abstract – results – line 5 - 7).

3. Methods

3.1. The data is seven years old. In the methods it is mentioned that the authors had access to the GEK data from 2006 (paragraph 2 – line 10). Why wasn’t more recent data used?

3.2. Paragraph 1 – line 1: The term cohort is used, but on the other hand it is also stated that a cross-sectional approach was used (Discussion paragraph 4 – line 11 – 13). Hence, the term cohort is not appropriate and the cross-sectional approach of this study should be mentioned in the methods.

3.3. No explanation of the multimorbidity and non-multimorbidity sample: In the abstract and results the term sample is used for patients with and without
mulitmorbidity, this suggest that not all patients with and without mulitmorbidity were selected. However, in the methods it is not explained how the multimorbidity sample and non-multimorbidity sample was created.

3.4. Missing explanation of how multimorbidity patterns were studied/how the triadic combinations were created.

3.5. Missing explanation of how (self-) referral rates were calculated.

4. Results

4.1. subsamples have not been explained in the methods.

III. Discretionary Revisions

1. Results

1.1. subtitle 2: Frequency of contact with physicians – paragraph 1 – Line 9:

I would love to see a table for the different age groups (subdivided for total cohort, mm-sample, nmm-sample, but not necessarily) stating the percentages of different contact frequencies in terms of contact per week or month.

<table>
<thead>
<tr>
<th>Age Group</th>
<th># 1 contact per week</th>
<th>% 1 contact every two weeks</th>
<th>% 1 contact every month</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 - 70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 - 75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75 - 80</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IV. Minor issues not for publication

1. Abstract

1.1. Aims: Please include some background that justifies this study (e.g. Background– paragraph 6 – line 1: “in order to estimate the future demands for health services, the analysis of current utilization patterns of the elderly and their determinants is crucial. Therefore the aim of this study is …”)

1.2. Methods: the authors should choose either to include more details in the methods or to simplify the presented results (of the abstract). For instance, the term multimorbidity needs some explanation? Also “multivariate methods” can’t this be replaced by multivariable linear regression?

1.3. Results: the total cohort and the multimorbidity sample are used in the results, but not explained in the methods. For the understanding of the results (in the abstract) it is not necessary to mention the total cohort or the mm-sample (e.g. “this proportion was higher among patients with less than 3 chronic diseases/without mulitmorbidity).

2. Background
2.1. Paragraph 1 – line 4 & 5 versus 6: overlap between these two sentences?

2.2. Paragraph 3 – line 3: This sentence is not clear: “For example, many studies on utilization related to age and gender are based on survey data with a recall-biased a posteriori investigation of utilization.” Aren’t the last two words to be deleted?

2.3. Paragraph 5 – line 4 & 5: I don’t understand this sentence. Is “fist” the correct word here?

3. Methods

3.1. Paragraph 1 – line 8: “previous studies have shown that results from the GEK database can be transferred to the German population as a whole if age and gender adjusted”. The references are missing.

3.2. Paragraph 3 – line 4: spelling mistake: in Germany

3.3. Paragraph 6 – line 1: in the text nurse dependency is also referred to as disability (e.g. background – paragraph 6 – line 4). If you prefer disability above nurse dependency than it should be explained in the methods that nurse dependency was included as a proxy for disability.

4. Results

4.1. Subtitle 1: Sociodemographic structure of the sample

4.1.1. Line 7: “women were overrepresented” # I prefer “there were more women than men with multimorbidity”.

4.1.2. Present these results in a table so that you can decide for yourself whether you want to see the difference in number of diseases or sex in the mm-sample, the nmm-sample or the total cohort.

4.2. Subtitle 2: Frequency of contact with physicians

4.2.1. Paragraph 1 – Line 9: I would take advantage of the way of writing the frequency of contacts in terms of weeks or months. The results are more striking when presented as “One contact every week or every two weeks”

4.2.2. Paragraph 2 – line 3 – 5: difficult sentence, I had to read it a few times before I understood it.

4.2.3. Paragraph 2 – line 7 – 8: I would delete “(e.g. 5 contacts per year in the mm-sample) although the mean age difference between the youngest and the oldest age-groups is 17 years.” It made it more difficult, while looking at the table is clear enough.

4.2.4. Paragraph 3 – line 4: “indexed” shouldn’t it be selected chronic conditions as indexed refers to the complete ICD index?

4.3. Subtitle 4: Size mode and target of referral

The choice of the subtitle is strange as this was not mentioned in the
aims/methods. Maybe “the utilization of primary care physicians in relation to specialists” is less confusing?

5. Discussion

5.1. Paragraph 1 – line 3: “2/3 more physicians” it was hard to interpret what it means that patients with multimorbidity have 2/3 more contact compared to patients without multimorbidity. Maybe try to formulate it differently.

5.2. Paragraph 3 – line 1: gender should be sex

5.3. Paragraph 4 – line 2 & 3: was this explanation supported by your data: had the oldest old less chronic diseases?

5.4. Paragraph 4 – line 9: “utilization in these two settings”: it was unclear which two setting were meant. I suppose the regulations are only different for living in the community versus nursing home?

5.5. Paragraph 4 – line 11 - 13: “On the other hand, these signs of a weak age-related increase in utilization may also be due to the cross-sectional approach of our study, since high utilizers may die at an earlier age, leaving the cohort nearly unchanged with regard to utilization of services”

I don’t understand what is meant with leaving the cohort nearly unchanged. It is a cross-sectional study so to population cannot change (in case of a cross-sectional approach the term cohort is not appropriate)

5.6. Paragraph 5 – line 5 & 6: combining these figures seemed to me a rather odd expression, certainly with the reference to previous work.

5.7. Paragraph 6 – line 2: “when controlling for other conditions”. This way it seems that separate diseases (conditions) were controlled for in the regression analyses. I prefer “when controlling for other covariables such as nurse dependency”.

5.8. Paragraph 8 – line 1: “comparatively high rate” compared to what, to whom?

5.9. Paragraph 9 – line 12: “the mean difference to the USA”. Shouldn’t it be the main difference? Also USA is inconsistently use e.g. in paragraph 11 – line 1 the “United States” are mentioned. And what does this sentence add to this paragraph? I believe it belongs to paragraph 12.

5.10. Paragraph 10 – line 1 & 2: “Interestingly, neither the profession nor the general public in Germany are aware of this distinctive situation. If they were, it would be generally considered to be self-evident and beneficial.” Can you make these statements?

5.11. Paragraph 11 – line 8: spelling mistake “seem play an important”

6. Conclusions

6.1. Line 6: “comparatively” – compared to what?
7. Figure 1:
It is not clear from the figure nor the title that the number of contacts is the mean number of contacts per year. (This applies also for the (mean?) number of physicians in figure 2)

8. Table 1: gender should be sex

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interests